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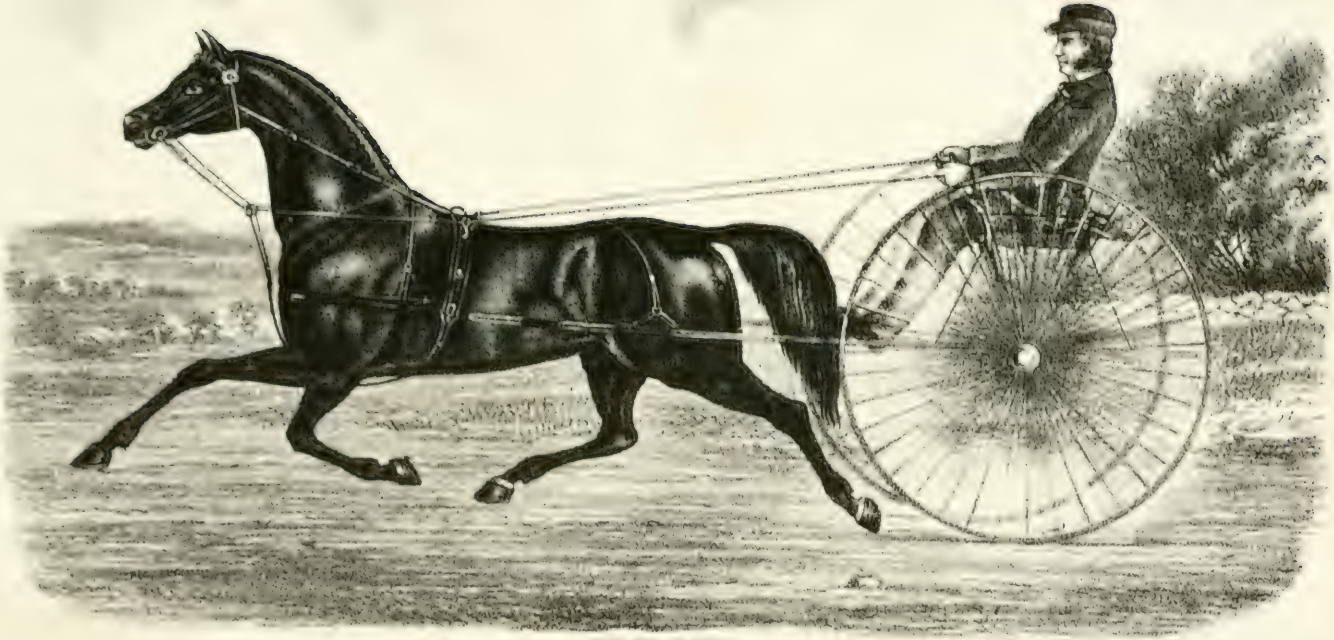

TELEGRAPH.

BLACK HAWK STALLION, OWNED BY THOS. S. LANG, ESQ

NORTH VASSALBORO

FIFTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

MAINE BOARD OF AGRICULTURE.

1860.

AUGUSTA:
STEVENS & SAYWARD, PRINTERS TO THE STATE.
1860.

BOARD OF AGRICULTURE....1860.

ISAAC REED, *President.*
JOHN F. ANDERSON, *Vice President.*
S. L. GOODALE, *Secretary.*

NAME.	SOCIETY.	P. O. ADDRESS.
	Term expires January, 1861.	
John F. Anderson,	Cumberland,	South Windham.
George A. Rogers,	Sagadahoc,	Topsham.
W. E. Drummond,	North Kennebec,	Winslow.
S. L. Goodale,	York,	Saco.
Daniel Lancaster,	South Kennebec,	Farmingdale.
Wm. M. Palmer,	East Somerset,	Hartland.
E. B. Stackpole,	West Penobscot,	Kenduskeag.
N. T. True,	Oxford,	Bethel.
	Term expires January, 1862.	
Seward Dill,	North Franklin,	Phillips.
E. L. Hammond,	Piscataquis,	Atkinson.
Ashur Davis,	North Somerset,	South Solon.
Hugh Porter,	Washington,	Pembroke.
J. S. Chandler,	Franklin,	New Sharon.
Joel Bean,	North Aroostook,	Presque Isle.
Wm. C. Hammatt,	North Penobscot,	Howland.
Albert Noyes,	Bangor Horticultural,	Bangor.
Alfred Cushman,	Penob. & Aroostook Union,	Golden Ridge.
Samuel Wasson,	Hancock,	Franklin.
	Term expires January, 1863.	
Isaac Reed,	Lincoln,	Waldoboro'.
Albert Moore,	West Somerset,	North Anson.
David Cargill,	Kennebec,	East Winthrop.
Robert Martin,	Androscoggin,	West Danville.
Calvin Chamberlain,	Maine State,	Foxcroft.
John Moulton,	West Oxford,	Porter.
Wm. D. Hayden,	Somerset Central,	Madison Centre.
David Norton,	Waldo,	Montville.
Warren Percival,	Maine Pomological,	Vassalboro'.

REPORT.

To the Senate and House of Representatives:

A detailed report of the doings of the Board of Agriculture being required by statute as a part of my Annual Report, I proceed to lay the same before you.

The members of the Board assembled at the Agricultural room in the Capitol at Augusta, on the 18th January, 1860, and Robert Martin, Esq., was chosen Chairman *pro tempore.*

Messrs. Wasson, Cushman and Dill were appointed a committee on credentials, and upon their report that a quorum were present, the Board proceeded to ballot for officers for the ensuing year, who were elected as follows:

President—Isaac Reed.
Vice President—John F. Anderson.
Secretary—Stephen L. Goodale.

The rules of order of last year were adopted.

N. T. True was appointed cabinet keeper and librarian.

Messrs. Martin, Chamberlain and Dill were appointed a business committee to present subjects for the consideration of the Board.

Pending the report of this committee, members were called upon to state the condition and progress of the Societies represented by them, and in response to the call, remarks were submitted substantially, as follows:

Mr. Anderson of Cumberland, said that farming in his county had made very considerable advancement within the past few years. It was just to say that this progress was greatly due to the action of the Cumberland Society. The last year had been more marked in this respect than any that had fallen under his observation. Within the last three years, draining had been introduced and met with marked favor. The second year's operations had more than quadrupled those of the first. Out of twenty-three farms examined during the past year by the committee on general farm improve-

ments in Cumberland county, twenty-one had undergone more or less of this kind of improvement, and the owners had adopted it as a very important feature in their efforts for improvement. This seemed to him a very striking and gratifying fact in agricultural progress. In his visit to these farms, he had been extremely interested in hearing the farmers set forth its benefits. They had tried it on a small scale, and were going to extend their labors in that direction. Not long ago, very few of these men, if any, would have thought of such a thing as expending money for underdraining. A manufactory of tiles had been established in Cumberland county. The gentleman who conducts it had informed Mr. A. that the demand for tile now exceeds the supply, while during the first year he almost despaired of making it a profitable business. In this connection, he would express the hope that the Board would in some way advise the State to prescribe the making of tile instead of brick in one of the departments of labor at the Reform School. The profit on the manufacture would be as great, while the benefit to the community would be greater.

There had been great improvement in stock during the last few years. This also was to be largely attributed to the action and measures of the Society. Especially had attention been directed to the matter of keeping stock. More than ever, boards and shingles had been resorted to for the saving of fodder, rather than to more expensive things. Farmers were fast learning that to keep cattle warm saves their hay, and that consideration for cattle and saving to the owner, go together. Nearly every man in Mr. A.'s vicinity now gives his stock good protection: and the trial is made to see if this mode of dealing will not forward the matter of building up stock more than any system or quantity of feeding will.

Mr. Anderson said that in a report on the subject of sheep and swine made to the Cumberland Society last October, attention was directed to the protection of sheep against mischievous dogs. The object was to see if dog owners could not be induced to substitute for dogs a more profitable animal as a favorite. He would read from the report referred to:

"We desire to repeat advice often given unheeded,—'that farmers keep fewer dogs and more sheep and hogs,' and propose a question for the earnest thought of those who regard the general good. Would it not be better for the State, if every farmer was allowed a certain number of sheep exempt from taxation, rather than, as now, the sheep-killing dogs? which infest the country,

and in all the State devour, annually, more than $100,000 worth of property, and within our houses, deal out fleas continually, and hydrophobia occasionally. In all seriousness, we ask our brother farmers—ought not the man who keeps a dog, to pay a tax upon him rather than upon a sheep, or twenty of them? Would not such a change in the assessment of taxes be the means of increasing greatly the number of sheep, and result in a great increase to the wealth of our State?"

Mr. Anderson enlarged upon the suggestion quoted. The pittance which now results from taxing sheep was nothing compared to the great amount of saving from the taking off the dogs. Moreover there is not a little feeling among poor farmers on the subject of taxing sheep, and many a man refuses to keep them from this cause. The fact that a dog, whose owner holds him worth $50, is untaxed, while the poor man's sheep, which the same dog worries, is the subject of taxation, operates with no good effect. Let the dog, which is almost always a neighborhood nuisance and an offence to every passer-by, give place to a better animal.

Mr. Noyes, of the Bangor Horticultural Society, said that it was in a flourishing condition, and increasing in influence. It had a show last autumn, which considering the season, was unusually good. The exhibition of plums was not so good as usual, but other fruits appeared well, and especially apples, which were magnificent. One man exhibited sixty varieties, and finer ones Mr. N. never saw, although he had visited many shows. Pears were very fair, though not so good as in some seasons. Vegetables were remarkably good, squashes in particular, specimens of which were the best he ever saw. The Hubbard squash was particularly promising. Many people had abandoned the Marrowfat for the Hubbard. The latter were better for keeping, and better for pies also.

Mr. Chandler of Franklin said he had been a member of their County Agricultural Society twelve to fifteen years; and at first not much interest was generally felt—eight or ten years ago members became more active. A change was made in their exhibitions which increased the interest felt, and about the same time a small fee was charged for admission, though many doubted its expediency. It worked well, however, and in a few years the amount so received paid the incidental expenses of the show and fair—some $70 or $80. Two years ago a permanent place for the shows was selected. Land was leased for twenty years, and proper arrange-

ments made at an expense of about $1,100. This placed the Society in debt, but its receipts have already reduced the debt to about $600. The receipts for the last year were $526, of which $468 were appropriated for premiums. The show was very good in nearly all its departments. The stock exhibited was superior; the teams were fine—not so many in number as at some other times, but in quality a great improvement over former years.

Considerable expense had been incurred by enterprising individuals in procuring choice blooded stock from which much was hoped. The stock generally throughout the county had improved greatly within a few years past.

Mr. Cargill of Kennebec said the Society he represented is the oldest in the State, having been incorporated by Massachusetts as the Agricultural Society of Winthrop. It afterwards became the County Society. For a series of years after leaving Winthrop, it was on trucks, and was sustained with difficulty. It was finally located at Readfield, and the shows had been held there for three years. Its grounds (leased by individuals) have been fenced, graded, and prepared for trials of the speed of horses and strength of oxen. It has increased in strength notwithstanding the State Society has held its fairs so near in point of locality and time; though it was not to be denied that this fact had somewhat detracted from its prosperity. Over $300 were raised the last year and expended for premiums, and for three days the fair was well attended. Some misunderstanding as to the time when it was to commence, interfered with its success, but still the receipts paid its expenses and something towards reducing the debt.

There was a fine display of stock, and among the cattle were some full blooded Devons. During the past year the Chester breed of swine had been introduced, with which farmers were greatly pleased, and a favorable change in pork raising was expected therefrom.

Mr. Drummond of North Kennebec stated that the debt of his Society had been reduced a thousand dollars or more during the past year. Their last exhibition was very good. The number of animals exhibited was not as great as at some former times, but in quality as good as ever, and greater in variety—particularly sheep and swine. The Chester breed of swine has been introduced. Some imported thorough-bred stock was exhibited.

Underdraining has been undertaken, and the deficiency in tile has been supplied by the use of stone and slate. The mode prac-

ticed is to ditch deep—fill in cobble stone, and cover with slate and brush. This practice is extending, and farms have been much improved. New interest has sprung up. Farmers' Clubs have been formed and lecturers procured.

Mr. Dill said that the North Franklin Society was increasing in numbers and interest. The past year's show was good, especially its stock. As to permanent location, our territory is so long and narrow, that it is difficult to settle down upon any one spot. The fairs are held alternately at Strong and Phillips.

Manifest improvement has taken place in barns and barn cellars, and in saving manure. A great deal has been, and still is, wasted, but farmers are waking up to their true interests in this particular. They also take better care of their stock, by procuring litter, &c. They have become more humane in the treatment of cattle, and he had observed that the best were those which were whipped least. In this respect the community, as well as the stock, felt the improvement.

Twenty-five years ago, we thought oxen girting six feet to be of good size; now, less than seven feet is considered small. This is partly owing to improvement in the breed. The same improvement is seen in sheep. Flocks are in every way improved, and all this may be chiefly ascribed to the influence of agricultural societies. Farmers are more anxious for knowledge, and for reading matter. There were few wealthy farmers in his vicinity. Many feel the need of capital. They have had to pay high rates of interest, and therefore labor under difficulties.

As an instance of what their soil with competent means might accomplish, he read a letter from Abner Toothaker of Rangely, stating that on a capital of $6,000, he realized a net income of $1,200. He raised 300 tons of hay, 1,400 bushels oats, 100 bushels wheat, 50 bushels barley, 300 bushels potatoes; made 600 pounds butter and 400 pounds cheese; had 115 head horned cattle, 12 horses and 175 sheep. Average crop per acre; hay 1¼ tons; oats, 50 bushels; wheat, 20 bushels; barley, 35 bushels; potatoes 200 bushels.

Mr. Lancaster stated that the South Kennebec Society held no exhibition last year, it having been merged in that of the State Society held within its limits; but while the Society was thus apparently in a quiescent state, its influence was active, and the vital principle was left, waiting only to be called into action.

As an Association, no progress has been made, but stock has

improved,—teams are clean and in good order—are better cared for and in better flesh. New stock has been introduced—the South Down and Cotswold sheep—and more attention is generally paid to sheep raising. Improvement was also noticeable in the crops.

Mr. Wasson of Hancock reported that the influence of the Society he represented was very marked, although it was only two years old. It has set men thinking, reading, and studying—has kindled a desire to farm scientifically, and not at haphazard.

At their last exhibition they were not particularly successful in attempts to secure outside attractions, but otherwise the show exceeded their most sanguine hopes. Fine Durham and other neat stock; choice breeds of sheep, South Downs and Cotswolds: excellent products of farm and dairy; choice articles of domestic manufacture, were all to be seen.

The population of Hancock was not wholly a farming one, but devoted chiefly to lumbering, fishing and other pursuits.

Mr. True of Oxford said that a marked feature of their last exhibition was the herd of twenty-nine Devons shown by Mr. Heald of Sumner. Their uniformity of size, shape and color, and their barrel-like fullness, especially in a season of drouth, attracted great attention. Another man (Mr. Holt of Norway) exhibited fifteen head, being a cross of Hereford and Durham, showing fine size and symmetry.

That section of the State lacked rich pasturage, and was not favorable for Durhams. A hardier stock is required. The Devons had been introduced, and also the Herefords. The exhibition of oxen was large.

The income last year was large: and though the Society was in debt a year ago, it is now getting aboveboard. Its influence is beneficial. There was a marked improvement among farmers generally: an air of thrift about them—they had more comforts and luxuries—were getting free from debt. Fine barns, with good cellars, had been built: the hauling of muck and other material for dressing, was practiced; a spirit of inquiry was aroused: a desire for books and papers prevails, especially for our State Reports, many of which had been distributed in remote sections of the county.

Mr. Percival of the Maine Pomological Society said that its first exhibition was held in 1855, since which it had held several others. Its means were limited, and the premiums consequently small: but the displays of fruit were excellent. There was a determination to extend and increase the influence of the Society.

Mr. Hammond of Piscataquis, spoke as follows:

I regret that I am not able to report to this Board, the flourishing condition of the Society which I represent here, and the interest and improvements which characterize our neighbors.

While there is manifest improvement within our limits, caused as I am forced to believe, in a great measure by the efforts of a few, there are too many (although in a position to render material aid by their council and contributions) and are constantly benefited by the efforts to advance this cause, who are yet unwilling to share the responsibilities and expense.

Our limits, geographically, are not so favorable as we could desire. Long and narrow, our fairs must be held near the centre, and the extremes feel that it is too much a burden to contribute to the show, consequently there are but few who do not reside near the location of the fair that contribute to numbers or funds.

We are still encouraged, however, from the fact that there is within reasonable limits of the show, ample ability to create a respectable society, whenever that ability can be made available. We are still further encouraged by the untiring perseverance and liberality of the few who now compose the Society, many of whom render material aid to the same without ever expecting to reap any other benefit for the money they pay, than the privilege of living in a thriving agricultural community, and in the enjoyment of seeing the prosperity of their neighbors. And I cannot believe that even those, by any means, lose their money; and as this light increases we hope to advance.

In regard to stock, most of the improved breeds have been introduced into the county, and exhibited at the fairs. Durhams, Herefords and Devons, and their grades, are receiving attention and multiplying, and the natives improving by crossing with the same. It is not yet, I think, determined which of the breeds is most profitable to the farmer to keep; but a general improvement is anticipated by equalizing the size, temperament and different qualities of the same; and so far as can be judged from the facts before us, success must attend this department of agriculture.

I think Piscataquis has not been far behind on horses. In regard to sheep we plead guilty. The pressure for money, and the ready means which sheep afford to supply that defect, has induced many farmers to part with their best sheep and reduce their flocks against their better judgment; but we have good reason to hope for a speedy end to this *drawback.*

We have an excellent soil for farming, but the demand for hay heretofore existing by our contiguity to the lumbering business, has operated injuriously by exhausting the farm; but we are, I think, recovering from this, and the farmers of Piscataquis are becoming convinced that stock raising, more economical modes of making and saving manures, and more thorough cultivation of the soil, are indispensable to general success in farming. Many are beginning to discover that they can by these means double the crop per acre, and thus make a saving in expense and labor. We have not, however, been able as yet, in the production of crops, to reach so high a figure as some of our neighbors: 60 to 80 bushels of corn, same of oats, 50 to 60 of barley, 200 to 300 of potatoes, is in truth about as high as we are able to report: and I think but few cut over two tons of hay to the acre. But if our neighbors continue to raise 125 to 140 bushels of corn per acre and make it profitable, we shall increase our efforts to approach that mark. We regard farming as a science, and think we have seen some of its benefits developed by practice in our community to such an extent, that it has divested us measurably of prejudices against book farming and agricultural periodicals, which are now studied with much interest; and the annual reports of the Secretary of this Board considered indispensable. And we cannot be insensible to the fact that the information thus derived in regard to agricultural improvements awakens energy in practice, new desires for more extensive knowledge, a love for the employment, operating as a moving power to the main body, approximating a more perfect system.

Mr. Moulton of West Oxford stated that the show of last year was good, except as to fruit. The exhibition of stock was fine. The Devons prevail and are preferred over Durhams, as better adapted to that section. A breed called the Hungarian was introduced about three years ago, and is regarded by the best judges with great favor. They are small, of sweetened milk color, good milkers, calculated for sharp and close grazing, and seem to know how to get their living where pasturage is poor.

Near the foot of the White Mountains there was much bog land suitable for cranberry raising. Ex-Governor Dana owned a large tract, from which he could make more money by raising cranberries than he could as Minister at Bogota. The soil in his section was adapted to fruit and stock. They were deficient in swine and sheep. Their sheep came from Canada and were the coarse wool

Leicesters. Improvement in building was noticeable. He knew one farmer whose barns cost $2,500, and another who had a barn worth $1,000.

Mr. Cushman of Penobscot and Aroostook Union said that the Society although not in so flourishing condition as he could wish, was annually gaining in importance and strength, as indicated by the magnitude of the shows, and the improved condition of the stock and articles on exhibition. The stock of neat cattle was larger and of better quality than before; there were some very fine grade animals, large in size, and beautiful in form—some of two years old, girting about seven feet, although the native stock greatly predominates. The stock of horses was large. Many fine and valuable animals were on exhibition. Also fine sheep, of large size, heavy fleece, and valuable for mutton. Increased attention is paid to that branch of husbandry. Very good specimens of garden vegetables, and of fruit, were shown. The ladies' department was proof that they do not come within the implication, sometimes of late years, cast upon the fairer sex, that "they toil not, neither do they spin," for a large amount of firm, heavy, and valuable cloths, spun and woven by themselves, were on exhibition, and a very respectable display of fancy articles. The Society paid out more money the past year than ever before.

Mr. Bean of North Aroostook reported decided progress in his vicinity, and that it was largely due to the influence of the Society and to the reports of the Board, by bringing the fertile soil of Aroostook to the notice of those abroad. Population is rapidly increasing, and the log cabin is giving way to larger and more commodious buildings. The crops of the past year were good, but as the premiums offered were small on account of limited means, the reports of committees did not nearly embrace all the best. As instances which had fallen within his observation he gave the following:

J. Crouse of Stony Brook, from 2½ bushels of oats sown, raised 146½ bushels. Jacob Hardison of Lyndon raised 190 bushels of potatoes from one-half acre. Messrs. Ham & Todd of Maysville gathered 98½ bushels of wheat from 2½ acres of burnt land, and 27 bushels of rye from 30 quarts sown. A. Kennedy of Maysville obtained 50 bushels of barley from two bushels sown May 10th, and 85 bushels of oats were sometimes cut upon one acre. Henry Rolfe of Maysville presented a potato weighing 3 pounds 9 ounces.

If the lands are made ready in the fall, there is no danger of the crops suffering from frosts.

Mr. Hayden of the Somerset Central Society said their last fair was a highly satisfactory one. Much interest is felt in horses and neat stock. Three horses reared in his vicinity had recently been sold for $1,200. Grades of Durham and Hereford were popular, as large oxen were needed for lumbering. Some thorough-bred stock had been recently introduced.

Mr. Davis of North Somerset said the Society had made good progress, especially in stock raising. The breeds most prevalent are the Durham and its grades. The Durham was by many considered too large. The Devons and Herefords had also been introduced. He thought the Devon one of the best, if not the *very* best, for his section. The Durham is large, open-built and tender, requires warm stabling and good food. The Devon is smaller, more compact, and more hardy. A cross of the two improves the size of the latter and the form of the former. There had been great efforts to obtain good sheep, and the improvement was very marked. They had proved profitable, especially on farms where it was difficult to get hay enough for larger stock. The French and Spanish Merinos, Cotswolds, and grades of Merino, had been found profitable.

Crops had improved. Attention had been directed to preparing and applying manures. Muck, composted with lime, salt and other articles, had been applied on run-out farms with great effect, producing good crops of corn and then of hay, showing how easily exhausted farms may be brought up. The muck was hauled out and spread over the barnyard, where it would absorb the liquids—allowed to lay a year—was occasionally plowed, and top-soil, leaves, straw and rotton wood mixed with it. The manure should be well pulverized and dry and spread in spring.

Mr. Palmer of East Somerset said their Society was organized over twenty years ago. Its shows went from town to town. Two years ago they located, bought grounds, fenced them and graded a track at a cost of $1,500. Had reduced the debt to $750. They were well satisfied thus far, and had been benefitted by location. The composting of manures had received much attention. Decided improvement was seen in stock. They had the Durham, Hereford and Devon breeds. Have adopted the rule to let one animal be be entered for premium until driven off by a better. There was a

good exhibition of manufactured articles. The effect of the Society was beneficial in every branch.

Mr. Moore of West Somerset said the influence of the Society was evident in the improvement of stock and of farms. The last fair was superior to any before. There was a fine exhibition of stock. The grade Durham prevails and is preferred. Wool raising is extensively carried on. The Spanish Merino is chiefly grown. The town of Anson alone sold last year between $13,000 and $14,000 worth. The exhibition of domestic manufactures was good, and there is an increased zeal in all departments of agriculture. Underdraining has not been extensively practiced, but has received some attention. Until last year no premiums had been offered on crops. Efforts are plainly visible in every section of the county to improve in all branches of husbandry.

Mr. Stackpole of West Penobscot, said the Society last year offered premiums amounting to $384.50. The show of neat stock was not large, but very good. There was some full blood Durham and Devon stock recently brought into the county; also horses—as good carriage and team horses, as can be found in the State. Of swine and sheep, there was a fair exhibition of very good animals. Our farmers do not keep sheep enough. More sheep and fewer horses would be better for the farmers of Penobscot. The products of the dairy fully sustained the high reputation so justly accorded to the ladies of West Penobscot. Good specimens of apples, pears, plums and grapes were on the tables. The display of vegetables was large and very perfect. The importance of a vegetable garden is better appreciated by our farmers than formerly. A greater breadth of land was put into cultivation last year than ever before, and the husbandman has received a bountiful reward for his labor. The crop of hay was very good; corn was grown to the amount of $110\frac{3}{4}$ bushels per acre. Wheat was not sown by many, but where sown produced well; barley was a good crop; 62 bushels per acre was harvested by one man; oats were very good, 74 bushels by one man, and 72 by another were raised from one acre of ground. Potatoes produced well, and were not troubled with the rot. This is a very important crop with us. It is said that there were shipped last fall from the port of Bangor alone, 100,000 bushels, at 40 cents per bushel, and there will probably be as many more shipped in the spring.

Mr. Martin of Androscoggin, reported their Society in a flourishing condition, and exerting a happy influence in improving the

practice of agriculture. Crops had improved materially and so had stock. They had Devons, Durhams and other improved breeds, some remarkably large. Root crops for cattle feed were receiving much attention.

The receipts and expenditures of the Society were steadily increasing, and their debt was being paid off. The coulter harrow had been introduced, and he deemed it a great improvement on the one formerly in use.

Mr. Norton of Waldo, said that Society was organized in 1847. The amount of receipts last year, was $491.80. The interest in agriculture and especially in stock raising, has increased, and the cattle have improved 33 per cent. at least. Buildings, particularly barns, have been greatly improved. In the saving of manures and of food for stock improvement is manifest.

He knew one farm, which at the time the Society was organized, had only a log cabin upon it and could have been bought for $600; now the farm and buildings would bring from $4,000 to $5,000. It then cut 30 tons of hay, now over 100 tons, besides some 3,000 bushels of esculent roots, 300 bushels of barley, 300 bushels of oats, 60 bushels of wheat, and 150 bushels of corn. $1,500 of last year's products would be sold from this farm. This change has been greatly owing to the influence of the Society.

Top dressing was extensively practiced, and mowing fields were fed less than formerly.

Mr. Porter reported the Washington County Society in a flourishing condition. Shows were held at two other places also, the past year. Devons have been introduced, and are highly esteemed. Of horses, there was a good show, chiefly of Black Hawk and Messenger blood.

Mr. Rogers reported the Sagadahoc Society as steadily prosperous from its organization to the present time. Stock had increased in value fifty per cent. The Devons and Jerseys had been lately introduced. Their exhibitions they felt could not be dispensed with. The time and labor expended on them were well spent and paid rich returns. Several farmers' clubs had been instituted, one of which had weekly meetings, and had lectures from distinguished agriculturists.

Mr. Reed said the people of Lincoln county were not very largely devoted to agricultural pursuits; many were engaged in commercial pursuits, shipbuilding, fishing, &c. Previous to 1855, comparatively little attention was paid to agriculture along the sea

shore. With the decline of ship-building many turned their attention to farming. The Society now numbered over 1,000, and was prosperous. The shows alternate from west to east, and are held at three different places. The neat stock on the ground last year, was large and good: also the swine. The products of the soil were greater than ever before. Fruit was very good. Gardens have been improved by setting out flowers, shrubs and fruit trees. Much attention is paid to making manure from seaweed, rockweed, muscles, and mud. He thought too little attention was paid to sheep raising. One man had told him that he kept 100 sheep on $1\frac{1}{2}$ tons of hay, with what they could pick up, through the winter. There were some islands on the coast which were used for sheep raising, but they were liable to "biped depredations." He thought the Devon stock the best for the region of the seashore. In his vicinity a good deal of salt hay was cut; this should be fed with straw or fresh meadow hay, and not alone; the market value of this was about half that of inland hay; it is considered as good for sheep, with coarse meadow hay. In the county generally, sheep were not extensively raised, nor were they of as good quality as in some other counties; he thought the number rather decreasing—owing to depredations of dogs.

Mr. Goodale said the York County Society was in successful operation, the exhibition the past year being fully satisfactory. Having located at Saco, aside from the geographical centre of the county, they had adopted a plan of paying mileage on such animals as were certified by the committees as being worthy of exhibition, for any distance over eight miles, sufficient to pay the actual expense—a plan which worked well, and might be adopted in other similar cases with advantage.

The business committee reported topics for consideration, to each of which committees were appointed by the President, as follows:

1. *Resolved*, That while knowledge is valuable in proportion as it aids in gaining a livelihood, it becomes us as an agricultural people to seek for our children such instruction as will best qualify them to make an intelligent application of labor to the purposes of life. Committee, Messrs. True, Chamberlain and Martin.

2. *Resolved*, That carefully conducted experiments in agricultural operations tend to progress by unfolding nature's laws and revealing to us those principles which are the foundation of all science in the art of husbandry, on the due observance of which, our success

essentially depends. Committee, Messrs. Chamberlain, Rogers and Moore.

3. *Resolved*, That the completion of the geological survey of the State is demanded by every department of industry, and that when resumed, it should be prosecuted also as an agricultural survey. Committee, Messrs. Dill, Drummond and Wasson.

4. *Resolved*, That the subject of fencing demands the careful investigation of this Board. Committee, Messrs. Hammond, Moore and Dill.

5. *Resolved*, That the need of veterinary science in Maine is such as to demand earnest effort to secure its benefits. Committee, Messrs. Anderson, Hammond and Drummond.

6. *Resolved*, That the interests of our agricultural societies would be promoted by the appointment of visitors to each show. Committee, Messrs. Norton, Chandler and Goodale.

7. *Resolved*, That the Board recommend to the several societies in the State to offer liberal encouragement for the introduction, breeding and rearing thorough-bred animals. Committee, Messrs. Percival, Cushman and Davis.

8. *Resolved*, That it is for the interest of agricultural societies to permanently locate their shows and fairs. Committee, Messrs. Bean, Cargill and Norton.

9. What is the best manner of renovating exhausted lands? Committee, Messrs. Lancaster, Rogers and Noyes.

10. What are the prominent causes of the decay of fruit trees? and what are the remedies? Committee, Messrs. Moulton, Hayden and Cargill.

11. *Resolved*, That this Board recognizes the importance of establishing market days or fairs for the sale of agricultural products. Committee, Messrs. Hammatt, Porter and Cushman.

12. *Resolved*, That the interests of the State would be promoted by the exemption of ten sheep, the property of one farmer, from taxation, and the imposition of a tax of two dollars annually upon every dog kept. Committee, Messrs. Palmer, Percival and Bean.

13. Can the honey bee be made profitable to the farmers of Maine, and how? Committee, Messrs. Cargill, Noyes and Dill.

Mr. True, for the committee on agricultural education, (the first topic,) submitted a report which was read and discussed at several sessions by Messrs. Wasson, Martin, Cushman and others, when it was finally laid on the table, and on motion of Mr. Wasson, who remarked that he had listened to the reading of the report with

great pleasure, but was not prepared to give approval to all its details, a resolve, with which the report closed, was unanimously adopted. The resolution reads as follows:

Resolved, That the views of the Secretary of the Board on agricultural education and the methods by which it may best be promoted, as set forth in an article on the subject in his last report, (1859,) and particularly on pages 161 and 162, meet the cordial approbation of the Board.

Mr. Chamberlain, for the committee to inquire into the importance of more carefully conducted experiments in agriculture, (second topic,) submitted a report, as follows:

"The source of all improvement in agriculture, as in all other arts, is *experiment*; and all experiments have their foundation in knowledge.

'Man conquers nature by observing nature's laws,' is a truism more generally understood and appreciated to-day than when first uttered.

A learned German has said, 'A *trial* is a question addressed to nature; when such a question is properly put, nature will necessarily reply either yes or no.'

It is on the art of making experiments that the principal power of man over the material world is founded, and that power will be extended as this art progresses and is carried into practice. An experiment of any kind is not easily made, yet they are in the power of every reflecting mind. Whoever has accomplished an experiment and has given a faithful account of it, has contributed to science, and consequently to useful practice, and is entitled to the gratitude of generations.

In the last few years we have seen a change in the habits and feelings of farmers towards what is termed *scientific farming*. That host of sturdy men and valuable citizens, who styled themselves 'practical farmers' in contradistinction to the daring experimenter who applied science to practice, and published the results—the host of *hand-laborers* who thought themselves proof against the seductive wiles of heterodox ideas—the obstinate, perverse, prejudiced men, who clung with foolish tenacity to old notions and old customs, unwilling to yield anything to the progress of the age, have been seduced from their citadels and captured, till there is hardly a baker's dozen left in array in the State.

That the better spirit of progress prevails, is evident from the increased numbers of books, papers and periodicals on agriculture

and its kindred subjects in the hands of farmers, and from the avidity with which our Agricultural Reports are received.

One of the strongest positions assumed by the 'practical man' in his self-conceit, against 'book farming' as he found it, has been, that the principles there given for our guidance, were derived from experiments conducted in other countries, or in distant parts of our own, where differences of climate, soil, customs and modes of operation, rendered the whole inapplicable with us and worthless. This position wears a semblance of truth, and so far as it has force, it still remains unabated.

The laws of the State under which our agricultural societies have been conducted in the last few years, were wisely conceived to aid in supplying a pressing want, by prompting those who should claim the bounties of the societies, so to conduct their operations as to be able to give in detail their practice.

The leading questions published by the State Society and some of the County societies, and the circulars issued by the Secretary of this Board, would seem to have been sufficient to the production, in some degree, of that desirable practice which these means were designed to accomplish.

Gentlemen at this Board familiar with the working machinery of agricultural societies, through whose hands have passed the statements required of applicants for premiums, will, I think, bear me witness, and our Secretary will perhaps admit, that nine-tenths of all such documents for any year, contain a sum total of intelligence that may be best expressed by an absolute *nothing*. The *spirit* of the law is inoperative, and the *letter* is sought to be evaded at every turn. Our whole operations are fast becoming a by-word and a reproach.

We will try our hand at drawing a picture or two, which gentlemen will perhaps recognize as more than a sketch from idle fancy:

On the day of the show and fair, a man approaches the good-natured Secretary, and asks to have an animal entered for a premium. It is at a late hour, and business presses. The individual lives, perhaps, in the immediate vicinity of the show, and has been watching the progress of the entries and the arrival of stock, and sees a place where there is a promise of little or no competition. His entry is made and he watches events. The judges proceed to pass upon such articles as are shown them. They are in a hurry and have no inclination to examine the statements of the several competitors. They shuffle off their task, thinking, perhaps, that

the job is well enough done, for the pay received, and our friend's animal is awarded a premium. The Trustees, after much care in publishing the law, and giving personal notice of its requirements in regard to statements, and even extending the time a number of days after the fair for the reception of statements in those cases where awards had been made in their absence, proceed to prune the reports of the judges, and our friend finds, after all proceedings are closed, his name omitted in the published report. He thereupon questions 'the powers that be': and though he values himself on his general intelligence, he pleads ignorance of the regulation, and straightway waxes exceeding wroth, and proceeds to blow up the whole niggardly concern; in which effort he only succeeds in exploding himself.

Another, with the best intentions, gets his blank of the Secretary on the morning of the show, and asks him to fill it with his statement. The Secretary is fully employed and cannot attend to it. He then looks for a friend who is ready with the pen, and whether he finds him or not, the blank is filled at last in a hurry; and he cannot under the circumstances remember that his pet Durham or Devon has eaten anything in winter but straw and a little hay, or has had in summer anything but an ordinary pasture. The milk it sucked for the first six months—the little palatable messes by which it was prepared for an easy transition from milk to a more solid diet—the extras it had all along received, were of too little consequence to be named in a hurry. Or, to bring both winter and summer keep into one concise and lucid expression, he simply says, 'has had only ordinary keeping'; and his duty to the State is discharged. To the curious, it is a matter of astonishment how much straw our premium stock consumes.

Our hope is large. We hope to see the time when a man will be ashamed to plead ignorance of the law prescribing the powers and duties of agricultural societies. We hope to see statements fully and fairly made, the rule, and not the exception. We hope to see our farmers of talent and learning, by their researches and experiments, speedily infuse new life and hope through the State, making our agricultural paper and our reports what they should be—hand-books for our guide, leading all into new and better modes of cultivation.

Farming is assuming the place of an art: and our laws are designed to encourage it as an art. There is no fairness in taking a premium for an article that is excellent only by chance; the thing

should be a representative of our care and skill. A carefully kept account of the entire process and cost of the production, should be shown for the benefit of others. The producer should be able to tell *why* his article excels. All articles offered for a premium should be thought worthy of a statement by those who offer them. The letter and spirit of our laws should be fulfilled. We want to progress out of our present miserably loose, slip-shod, guess-work manner of getting along. We want many real home-made, thorough, mathematical experiments in the various departments of husbandry.

In 1858, our Secretary very modestly asked of the farmers, to try but one experiment—that of applying manure variously to one acre of corn. Out of the 100,000 acres of corn planted in the State that year, we have yet to learn that more than a single individual made the trial; yet the subject of 'application of manure,' is a debatable one at our clubs and everywhere.

Our worthy Ex-President strenuously contends that the hog is a self-sustaining animal; and he has planted his notions all over the State, and they are of worth in a general way; but several thorough experiments with the animal are still wanted, before farmers will see and feel the full force and beauty of his teachings and profit by them.

There is a great want of accuracy running all the way through the published experiments touching any question of farming. Men are very liable to leave out something which it is necessary to know in order to substantiate the accuracy of the experiment. Unless experiments are conducted with rigorous accuracy, noting every influencing circumstance, we may in vain expect to accomplish anything creditable or profitable.

It is desirable to remedy the present state of things, by instituting a systematic trial of experiments, that shall subserve the upbuilding of agricultural science. The best agencies now in existence amongst us, for the promotion of this object, are our agricultural societies; and to the managers of these associations we will look for some provision for their institution, and for the preparation of suitable formulas for the guidance of experimentalists."

C. CHAMBERLAIN, *per order.*

After discussion by Messrs. Cargill, Cushman, Wasson, Chandler, Anderson, and others, the report was adopted.

Mr. Dill, for the committee on geological survey, (third topic,) recommended the passage of the following:

Resolved, That the completion of the geological survey is imperatively demanded by every department of industry, and we urge that when resumed, it be prosecuted with special reference to its bearing upon the agricultural and educational interests of the State.

The resolution passed unanimously.

The committee on fourth topic reported as follows:

"The committee to whom was given the resolve 'that the subject of *fencing* demands the *careful investigation* of this Board,' have had the same under consideration and report:

That, in their opinion, the long established custom of this country to surround the farm with a good substantial fence, and then to divide it into small fields and pastures so that all may by turns be occupied by the farm stock, has so fixed its importance upon the minds of the farmers of Maine, that it will require much argument, and considerable lapse of time before any other system can be expected to receive particular consideration.

It is presumed that so long established a usage which has caused such an extensive outlay, cannot be suddenly abrogated or even materially changed, until the community shall have made that *careful investigation* of the subject recommended to the Board by the resolve under consideration.

Although the opinion of a few might differ from the mass, and the laws of the State might be in accordance with that opinion; yet it would be impracticable, we might almost say impossible, to make the law available in this case till public opinion shall be so changed, that a large majority shall favor an alteration of the system and the laws by which it is regulated.

If the present system of thus enclosing and dividing the farm, cannot be materially altered or dispensed with to a considerable extent, it would seem that little could be said for any practical purpose, beyond recommending to farmers to study the cheapest methods within their reach to erect substantial, durable, straight fences, crossing at right angles when it can be conveniently done, at the same time giving the fields as much length as practicable, that they may be cultivated with as much ease and little expense as possible. And we will here suggest, whether the English custom of hedging, might not be in many localities profitably adopted, and at the same time be ornamental to the farm. But notwithstanding the long established custom, it is at least questionable, whether the present expensive system of fencing, may not be mate-

rially changed for the better with a very great saving of cost and labor to the farmer.

If (as stated in the Secretary's report for 1859, page 217, in a communication from Mr. Chamberlain on the subject of soiling,) the cost of fences in Maine is twenty-five millions of dollars, and the changes and repairs amount annually to ten per cent. on the cost, then we have for changes and repairs two millions five hundred thousand dollars, and the interest at six per cent. annually on the cost is one million five hundred thousand dollars. And allowing wooden fences to last twenty years, we find a twentieth part of the first cost to be one million two hundred and fifty thousand dollars, which shows an annual expense to the farmers of Maine of *five millions two hundred and fifty thousand dollars.* Recapitulated as follows:

10 per cent. on first cost for changes and repairs annually, is	$2,500,000
6 per cent. for interest on same,	1,500,000
First cost divided by 20, (years of duration,)	1,250,000
Total annual expense of fencing,	$5,250,000

Your committee concur in the remarks of that communication to which we have referred on *interior* fences to which they are confined; and beg leave to call the attention of the Board particularly to road fencing.

Assuming the road fences to cost one-eighth part of the whole, and we have three millions one hundred and twenty-five thousand dollars. Allowing twelve per cent. to cover the annual interest and repairs, and we have three hundred and seventy-five thousand dollars as a tax per year (exclusive of building the fence) for the privilege of pasturing the highway or common. And if this fence has to be renewed once in twenty years we may add one twentieth of the cost of building as loss, and we have a yearly tax of $531,-250 for the encouragement of one of the greatest nuisances the farmer has to endure, that of always having a drove of hungry cattle watching for a chance whenever his gate is open or bars down to step into his garden, or yard, and destroy some choice trees, or into his corn-field, while he is left to the alternative to leave a load of hay to get wet with a shower close upon him, and go and drive them out and close the entrance, or leave them to take care of the corn, while he secures the hay.

Then there is an additional yearly tax, which from any calcula-

tion we are able to make, we cannot set down less than one hundred and fifty thousand dollars for breaking through snow-drifts caused by such fences, and we have the annual damage or cost of road fences. Recapitulated as follows:

Loss on road fences from yearly decay,	$156,250
Repairs and interest yearly at 12 per cent,	375,000
For breaking roads annually in consequence of fences,	150,000
Annual cost of fencing the roads and damage,	$681,250

$681,250, which we may fairly set down as a yearly loss in labor or cash to the farmer, leaving the many inconveniences he is subjected to in consequence of such fences out of the account.

We can readily imagine many conveniences which would be secured by the absence of road fences. It would give access to the field without the trouble of gates and bars. The land may be cultivated to the traveled path, and the farm much improved in appearance. Most farmers feel that they must have their buildings surrounded by fences to save themselves from the intrusion of cattle and hogs at large on the commons. And many, because their buildings are not of the latest or improved style, or somewhat old, excuse themselves for letting the old log or rail fences remain around them, and other somewhat unsightly encumbrances, and submit to the inconvenience of gates or bars for access to the road; when if they would clear the whole away, and substitute a few ornamental trees instead of the fences, and cultivate around the house leaving only the necessary paths to and from the same, any sort of a dwelling would be vastly improved in appearance, and an actual gain by increased products, &c.

We hope the subject of the road fence will be especially considered, as we are not in this respect, trammeled by law, but by custom. And when this is changed, we shall have taken one important step in the right direction. The law does compel us to build half of division fences, whether they benefit ourselves or otherwise. But in the opinion of your committee, all laws are of doubtful policy, to say the least, which compel us to build fences exclusively for the benefit of our neighbors; and we believe the true policy to be, that every man should be accountable for damages by his own cattle, and obliged to build only such fences as suit his own convenience.

We cannot see why a man should not be as liable for damage or

trespass by his beast, as by himself: or why he should be compelled to build walls to protect his property against spoliations of cattle, any more than against the owner, who could not avail himself of the plea against theft or trespass, that the door was too weak, the lock insufficient, or the walls too low.

We cheerfully concur in the remarks on this subject, expressed in a meeting of the American Institute Farmer's Club at New York, November 14th, 1859. Mr. Joseph Blunt said: 'The farmers in this country were formed and educated under the system of fences; a system founded upon the notion, that a man is bound to protect his property by fencing out the world: that the law has no power; that a general respect for the rights of property has no existence; but that you must fence out all intruders, and guard your property with walls and fences, if you desire to enjoy it as your own. * * * The whole system is founded upon an erroneous notion. The law does protect a man's property. His real estate and its products are his, and they lie under the protection of the law, whether *fenced* or *unfenced*. * * * A man has no greater right to bring up his cattle in dishonest practices than he has to educate his family by theft. But many seem to think that cattle may be brought up to habits of theft and trespass without any legal responsibility, and that they may be turned out by day or night to prowl round on the highway, to watch for an opportunity to slip in at open gates, or open them for themselves, and then with *their native instincts and their master's principles*, making your carefully-nurtured domestic institutions unfit for your enjoyment. This is unsound reasoning, and the sooner it is corrected the better it will be for the farming community.'

In conclusion, we recommend to the farmers of Maine to figure up the cost of their fences; add the annual expense and interest on the same, consider the inconveniences they suffer in consequence of the system as it now is, and see whether or not, it may be changed for the better by saving expense and improving appearances.

The question will undoubtedly arise in the mind: How shall a change be brought about? So far as it regards road fences, in any town or neighborhood where a half dozen men can be found who '*know their rights and dare maintain them*,' who will throw down their road fences and enforce the law when actually necessary, they will soon effect a change, do the community around them an essen-

tial service, and contribute to the public good by relieving them of a heavy tax for which we conceive no benefit can be derived commensurate with the expense."

E. L. Hammond, A. Moore, S. Dill, *Committee.*

After an animated discussion in which it was agreed by all that it was very desirable to lessen the enormous expense now incurred for fences, and that the subject needs careful and deliberate investigation by all farmers, the report was adopted.

Mr. Anderson, for the committee on veterinary science, (the fifth topic,) submitted a report as follows:

"Your committee, appointed to consider the need of veterinary science in Maine, have carefully attended to the duty.

We believe this to be one of the most pressing of our wants; one which is hurtful to the health of the man, as well as the beast, inasmuch as he depends, for his daily food, upon animals which may be in a more or less diseased condition, without the means to prevent, or even to know that such is the fact. There exists, in truth, so intimate a connection between the man and his beasts, that if they suffer, in ever so little, from disease or accident not only, but from bad management, discomfort or even the want of unremittant, thoughtful care, which shall anticipate all dangers, the owner must also suffer in commensurate degree.

By its absence, we not only have constantly recurring losses and frequent depreciation of the property which we possess in our live stock, but, equally too, the annoyance of feeling that in each instance we play the fool ourselves in parting with money spent upon some pretending ignoramus whom we employ, because it must perforce, be either him or none.

As the barber-surgeon of olden time erected in the most conspicuous place his banded pole, and, in the absence of more skillful ability, attracted those who required either shaving or the letting of blood, so now the farrier, as he is called—the quack as he is—thrusts his impudent promises before our eyes in public prints, and from this complete absence of thorough veterinary science and practical skill, draws us into the support of ignorant assumption, and very often, knavish empiricism.

With filthy lotions, useless liniments, offensive applications, and revolting medicines, (among the most common of which are fresh animal excrements and a decoction of domestic guano,) the country 'cow-doctor' essays to mend constitutions and soothe stomachs more delicate and more sensitive than those of man, because never

injured by evil practices to which he resorts for the purpose of either living as much in a minute as possible or destroying consciousness of an existence he cannot make sufficiently agreeable; while the practice of the city 'horse-doctor' is an improvement upon this only in its being less nasty but more dangerous.

On such as these we, who are absolutely free from any veterinary acquirements, must entirely depend, while those who, from having invested considerable capital in live stock, and from this fact are forced to attempt some reading upon the subject, can get no other aid in guiding their efforts.

An impression seems to prevail, that but little study is necessary to qualify a man to practice this art: that only the exercise of a little common sense, as it is often said, with an active observation, is all that is required for successfully treating the diseases of cows, horses, sheep, and swine. But the advantages of high attainments in the man who practices the treatment of disease in your brother man, are more generally recognized. Your committee cannot permit this impression to go unchallenged. While they admit that his bad habits, and willful persistence in his own way, may more frequently complicate his disorder, and vitiate his blood, yet he has the power of indicating the parts affected and to convey a clear idea of his disorder, upon which his physician may very readily make a diagnosis of the case. But the veterinarian has no such aid: he is thrown at once upon his own knowledge of anatomy, physiology, pathology and natural history: his perceptive faculties require to be far more acute and his judgment fully as sound: for him, too, man complicates the disorders of animals by the artificial position in which he retains them. Wilson says, 'The veterinary art, according to the present acceptation of the phrase, comprehends a knowledge of the external form, as well as the internal structure and economy of our domestic quadrupeds,—their appropriate management,—the nature, causes, and treatment of their disorders,—and the art of shoeing such of them as may be found to require it.'

Dr. Cuming, in the suggestive paper given us by Mr. Goodale in the report of 1859, very pertinently says: 'Were it not a fact patent to observation, it would hardly be credited, that an intelligent and literary people like that of the United States, and loving horses as they do, have yet the first step to take, for placing veterinary surgery in the position of an art and science in their country. But so it is, and veterinary literature, adapted to the wants and

circumstances of the western continent, has yet to be written. This is said in no disparaging spirit, but is simply expressive of the little that has yet been attempted, in comparison with the greatness of the work to do; and if any one doubts its truth, let him point out the publications that exist to disprove it. In all of them that the author has seen (he says) the descriptions of diseases are too palpably English to be applicable to American circumstances; while the modes of treatment prescribed, wherever originality has been attempted, are too American to be of use in any but the slightest cases, or those that would do better if left by themselves.'

In connection with Dr. Cuming's name, and the existing poverty of veterinary knowledge which is ours, and with a thought upon the constant and incalculable good we might have from the presence of an educated practitioner of this art, your committee desire to call the attention of the Board to the results already known to all, from the article on Horse Shoeing, written by this thorough veterinary surgeon, and published in our report of 1857, the merits of which are very widely recognized. Who of us can doubt, that the gain of dollars to this State from the information imparted by that single paper, is sufficient to give a handsome support to such a man, if it could be gathered and devoted to this object? and who can estimate the gain which would accrue to us by his constant residence here? Losses, to have been thus avoided, have occurred within the observation of each member of your committee, which would have amounted to a very considerable sum, to be counted by hundreds, if not by thousands of dollars.

And to a few hints dropped by Dr. Cuming while inspecting the neat stock of one member, he is indebted for a most decided improvement in rearing his young animals, so that by his present practice he obtains results in one year which before his interview with that able man required two.

Such being the views of your committee, they would urge the Board to adopt the resolve, 'That the need of veterinary science in Maine is such as to demand earnest efforts to secure its benefits.'"

J. F. Anderson, E. L. Hammond, W. E. Drummond, *Com.*

Mr. Dill said that in no department of agriculture was there a greater want than in that to which the report related. Our cattle were sick of all manner of diseases, and without a remedy. The loss of property from the prevailing ignorance was not the worst result. Men were tempted to sell their sick cattle to drovers, where the disease was of such a character as to be hidden from

superficial observation, and drovers were in turn tempted to sell to the butchers. It was sickening to reflect upon the probable amount of diseased meat which was consumed by the people. A few competent veterinary surgeons in Maine would so instruct stock growers as to do away with much of this trouble.

Mr. Davis thought the communities were rare where sick cattle would be knowingly sold to drovers. If however, the evil existed, he hoped a remedy would be proposed.

Mr. Anderson had no idea that the evil existed to so great an extent as indicated by the gentleman from Franklin county: but he was satisfied it was sufficiently extensive to demand action on the part of our people. He believed remunerative fields were open in Maine for veterinary surgeons. The people of New Brunswick moved in this matter some years ago, and induced a Professor of Veterinary Surgery to come over from the Edinburgh University and settle among them. He hoped, however, that Maine would not imitate the example of that Province in following up such an invitation with inadequate compensation. He believed she would not. If we could be sure to get a really scientific man to settle in Portland, or even Boston, the demand from this State upon his knowledge would, Mr. A. thought, be remunerative. For the present, Mr. A. did not know one such surgeon who was accessible.

Mr. Goodale said our greatest need was to know and feel our wants in this regard. If the people were really alive to this, the demand would create the supply. Dr. Cuming, the late distinguished veterinary surgeon of New Brunswick came over from the Veterinary College at Edinburgh at the instigation of the New Brunswick Society for the promotion of agriculture, and if Dr. C. had lived a few days longer, Maine would doubtless have secured a competent surgeon through his instrumentality. At the time of his death he was in correspondence with one, and was about to advise him to move to Portland; but his sudden death prevented, and the surgeon effected an engagement in Australia, and was now on his way thither.

There was not only the constant need of skilled men in the cases ordinarily occurring among us, but occasionally new diseases or new forms of disease broke out where there was the most imperative need of immediate scientific investigation. Happily we are free from some of the most serious cattle maladies known in Europe as the murrain, pleuro pneumonia, red water, &c., but there con-

stantly exists a liability to new developments which it would be well to provide for so far as practicable.

Mr. G. alluded also to the barbarous practices in vogue with ignorant pretenders to farriery, such as boring the horns of cattle and forcing medicines into them, &c., &c., and which would be banished at once when more intelligence on the subject shall prevail; he thought the promulgation of our needs in this regard might possibly result in bringing a veterinary surgeon to reside among us.

The Veterinary College of Edinburgh began in a very small way not long ago. Dr. Dick and one other professor at first lectured a whole term to a class of *one*, but now the college was one of the most flourishing institutions of Europe.

The report was then adopted.

Mr. Norton, for the committee on appointment of visitors to the various agricultural shows (the sixth topic) read the following report:

"The committee charged to consider whether it be advisable for this Board to appoint visitors to the various county agricultural exhibitions, beg leave to report, that, in their opinion, this measure would accomplish great good. We might expect from such visits reports which would be of greater value than would be furnished by one residing in the immediate vicinity. They might be more accurate, if not more impartial; for, as is well known, we do not always see ourselves as others see us, and there is good authority for saying that it is unwise to judge ourselves by ourselves or compare ourselves among ourselves. It seems very probable that the attention of a stranger would be arrested by many matters, novel to him but not to residents in the immediate vicinity, and which might not be thought worthy of mention by the latter, while in fact it might be of great advantage for others to know and imitate; or the stranger visitor might be able to give hints for improvement regarding what he sees, whether as to methods of treatment in animals or of culture in the production of the vegetable or crops shown, or as to methods of conducting the exhibition itself. He might obtain valuable information on many points, to carry home for the benefit of his own society.

Anything which brings farmers more together, so they can profit by each other's experience and compare methods and results, is highly beneficial and worthy of encouragement, and almost sure to secure some advantage.

The committee further submit, that this plan has been adopted in a sister State—has been found to work well—to accomplish much good. Any one who will read the Massachusetts Agricultural Reports, can better judge of this fact for themselves."

After some discussion, on motion of Mr. Anderson, the report was adopted, and subsequently, measures were taken to carry out the views of the report, which resulted in a recommendation by the Board that the several societies each appoint a visitor to another society, as follows:

Cumberland to visit Washington.
Sagadahoc to visit South Kennebec.
North Kennebec to visit Somerset Central.
York to visit Hancock.
South Kennebec to visit North Somerset.
East Somerset to visit Piscataquis.
West Penobscot to visit North Penobscot.
Oxford to visit Sagadahoc.
North Franklin to visit West Oxford.
Piscataquis to visit Androscoggin.
North Somerset to visit East Somerset.
Washington to visit York.
Franklin to visit Kennebec.
Maine State to visit Oxford.
North Aroostook to visit Penobscot and Aroostook Union.
North Penobscot to visit West Penobscot.
Penobscot and Aroostook Union to visit North Aroostook.
Hancock to visit Franklin.
Lincoln to visit Maine State.
West Somerset to visit North Kennebec.
Kennebec to visit Cumberland.
Androscoggin to visit West Somerset.
West Oxford to visit Waldo.
Somerset Central to visit North Franklin.
Waldo to visit Lincoln.
Maine Pomological to visit Bangor Horticultural.
Bangor Horticultural to visit Maine Pomological.

Also that the visitor be appointed by the society directly or by the trustees, and that the visitors forward their reports to the Secretary of the Board (at Saco) within ten days after the exhibition.

Mr. Percival, for the committee on encouragement of thoroughbred animals, submitted the following:

"The committee on seventh topic, ask leave to report. It reads thus—

Resolved, That the Board recommend to the several societies in the State, to offer liberal encouragement for the introduction, breeding and rearing of thorough-bred animals.

We favor the resolve, believing that the result would increase the wealth of the State greatly.

We do not propose to attempt to point out all the peculiar characteristics of the various breeds or races of animals,—such as the Messenger, Morgan, Black Hawk, race-horse, &c.; the Durham, Devon, Hereford, Ayrshire, Jersey and other cattle; the Spanish, Silesian or French Merino—the South Down, Cotswold, Leicester, or other sheep; or the Essex, Berkshire and Chester swine—knowing full well that every man has his favorite and will select for himself.

There are in this State, 54,508 horses, 62,578 oxen, 132,045 cows, 374,195 sheep, and 45,923 swine.

Now, if our State had, ten years ago, imported thorough-bred animals sufficient to have crossed with our native stock, at a low estimate the grades would now average three-fourths blood in each race; and if we reckon our horses, either in home or foreign market, at $10 each more than the original stock, we have $545,080. We also would estimate $5 advance upon each ox and cow reared upon the same principle, and we find a margin for a profit of $973,115. In addition, we think it safe to reckon our sheep at 50 cents and our swine at $1 per head, which would leave a balance of $183,020—all told, would give us an aggregate of $1,701,215 net profit from the operation.

We are well aware that many old fogies will turn up their noses, and say that book farming or scientific farming, agricultural schools, cattle shows and fairs, pomological or horticultural exhibitions, and imported animals, and this sort of stuff, is all moonshine; but they will borrow a book from the agricultural library, and forget to return it—crawl over or under the fence into the show grounds;—the Trustees will pass them into the horticultural exhibition—the apples are tempting, and they pocket the biggest one in the basket; they have a nibble at the Bartlett pear—a few grapes from the largest cluster would be delicious; and finally, they pluck the choicest flowers from the prize boquet to carry to some darling baby, and leave—blowing all these 'fixins' sky-high.

But we insist that every intelligent man, when he gives the matter a candid, impartial investigation, will involuntarily exclaim, 'these matters are worthy of our consideration!'

Let any man attend even our county shows in Maine, and compare the full-blood and grade Durham, Devon, Hereford and Ayrshire with the native upon the ground (where we find the best of them) and he will admit, without attempting to argue the case, that the improvement from their importation has exceeded his expectations, and that our per cent. is far too small.

We are of opinion that a man's aim should depend very much upon circumstances. If he is in a locality where feed is luxuriant, and heavy, fat beef commands a high price, perhaps he would prefer the Durham. If his locality requires greater activity, labor and growth upon more scanty feed, where uniformity of color is desirable, and the consumer demands beef in smaller quantities or from smaller animals, he would no doubt prefer the Devon, the Hereford, or Ayrshire; while if a small quantity of very rich milk was desirable, he unquestionably would select the Jersey. Experience has taught us that every man should be his own judge—and he may be, by informing himself either by observation or experience, or both—for we believe that knowledge is power, in every department of life, from the Executive down to the raising of pigs and chickens. We trust you will not think it derogatory to the former to be classed with the latter, for we conceive them to be very intimately connected, and without the one the other could not exist."

The report was adopted.

Mr. Bean, for the committee on location of exhibitions (the eighth topic) submitted a report advocating the expediency of the Board so recommending to the Societies; after some discussion the report was laid on the table and the following resolution passed:

Resolved, That the subject of location should properly be left to each Society to act upon as their judgment may dictate.

Mr. Rogers, for the committee on best method of renovating exhausted soils (the ninth topic) reported as follows:

"In treating upon this subject your committee feel utterly incompetent to do it justice. It is a subject that ever has and ever will be open to discussion.

The diversity of soil to be acted upon, the different localities in which it is situated, and the means most accessible to improve it, are so varied that it would seem impossible to prescribe a rule of

action that would apply to all cases. Very much of the soil that is commonly termed worn out, and which in reality produces little or nothing, is rich in nearly all the elements requisite to support vegetation, some one alone being necessary to be supplied to cause it to produce bountiful crops. Now had the farmer sufficient knowledge to enable him to determine what was lacking in the soil, he would at once be prepared to apply the proper remedy. But as the majority of farmers have not that knowledge, and probably will not have for a long series of years, if ever, the only course that we should feel justified in recommending to them would be to avail themselves of the knowledge and experience of others, and apply such remedies as their own judgment should dictate as being best adapted to the circumstances in which they are situated, noting carefully the result of each different course pursued, and following up that which proves the most successful and economical. For it is a question of the utmost importance with a large proportion of the farmers of Maine, not only to know how they are to improve their land, but also at the same time how they are to support themselves and those dependent on them. Any course that will not enable them to do this, we would by no means recommend. Farming for pleasure, by those who have plenty of capital is very different business from that of farming as a means of subsistence and of securing a competence against a time of need, by those whose capital is invested in a sterile soil and a stout heart. The first class care not for expense, and can resort to any means to secure the end. To the latter class economy is of vital importance. They must of necessity be very cautious in adopting new theories: and they should be so, for it is no uncommon thing for agricultural writers, and those professing to be teachers in the principles of agriculture, to make assertions and advance theories which have no foundation in practice.

A liberal and proper application of barn manure, together with a thorough pulverization of the soil, and a frequent stirring of the surface, is a sure method of renovating land, however exhausted.

But whether that is the best and cheapest manner must be determined by the circumstances in which the farmer is situated. At all events we would recommend him to look well to his manure heap. It is a source of wealth which should by no means be neglected. Quite too little attention is paid by farmers in general to the manufacture of manure upon their own premises. There are

various methods of doing this that will suggest themselves to a thinking mind.

In many places the *soiling system* could no doubt be adopted to some extent at least, to good advantage. It is claimed by the advocates of that system that it is the cheapest of all modes of obtaining manure. In this connection we would refer the farmer to an able article upon this subject, by Mr. Chamberlain of this Board, published in the report of the Secretary for 1859. Where muck is easy of access, we recommend that equal quantities of that be mixed with barn manure, after being treated to a dose of salt and lime. Such compost your committee consider about equal to barn manure, and when applied liberally, and well incorporated with the surface soil, will never fail to give a good account of itself.

Frequent plowing and stirring of the soil, tends very much to its improvement. And here we would say, that as a general rule, we would not recommend plowing so deep as to bring to the surface the subsoil to any great extent—particularly if but a moderate quantity of manure is to be applied. No doubt there are instances where such plowing proves beneficial; but they have failed to come under the observation of your committee. And we would caution farmers against practicing that method generally, before being fully convinced in their own minds of its utility. But we *do* urge the importance of thoroughly pulverizing the surface soil. Too much importance cannot be attached to this part of the business when land is under the plow. Old mowing lands, such as are naturally adapted to grass, and situated where hay is a desirable product, if not infested with moss may be greatly improved by a liberal top dressing, applied late in autumn, of well decomposed manure or of compost such as we have described above.

Ashes on some soils, produce a wonderful effect as a top dressing for grass land. Guano, super-phosphate of lime and bone dust when obtained free from adulteration, are frequently used to good advantage. The first two named articles soon expend their virtues, and effect no lasting benefit to the soil, except what may be returned to it in the shape of manure from the increased productions of one or two years.

Plaster also is excellent on many soils, and for such as it is adapted to, is a very cheap manure. On some soils there is very little perceptible benefit derived from it when used alone. But we would impress upon all farmers the importance of using it liberally about

their barns, and manure heaps, as it arrests and fixes the ammonia, and consequently increases the value of the manure.

Plowing in green crops, such as clover, buckwheat, &c., is recommended as being a very effectual method of improving exhausted land. A very intelligent and observing man, in addressing the Hampden East Agricultural Society of Massachusetts, on the Laws of Vegetation, says, 'I know of no so obvious and valuable means of fertilizing worn out or naturally barren land, as the turning in of green crops.' This statement is corroborated by the experience of many, not only in Massachusetts, but in our own State.

It is a fact that Mother Earth, like any other bank, will cease to discount when her resources fail. By continually taking from our land the crops which it produces, and supplying nothing in return therefor, the organic elements of the soil become exhausted, and the deficiency must be supplied before it will again become fertile. In many instances, plowing in green crops is perhaps the most available and economical method that can be resorted to to supply the deficiency.

Another method of renovating exhausted lands which we would not fail to introduce to the favorable notice of the agricultural community is the keeping of sheep. And in relation to that we would direct their attention to Mr. Goodale's Reports of 1857 and 1859, where the advantages of sheep husbandry with regard to the renovation of the soil are very clearly set forth; as are also its advantages pecuniarily.

We would also refer them to the report of 1857 for an able treatise upon this very subject of restoring fertility to partially exhausted lands.

Having thrown out these suggestions, and without presuming to prescribe any one particular course to be followed in all cases, we submit the subject to the careful consideration of those having exhausted lands, hoping that they may be profited thereby, and be induced to make use of the means best adapted to their circumstances, and cause, 'the waste places to rejoice, and the desert to bud and blossom as the rose.'"

DANIEL LANCASTER, GEO. A. ROGERS.

Mr. Anderson inquired if it was a fact that superphosphate of lime expended all its virtues immediately.

The Secretary replied that the substance sold in our markets under this name was of *very unequal composition and quality*. Superphosphate of lime, pure and simple, was readily soluble, and would

give up its valuable effect mainly to the first crop. This was nothing against the value of a manure so easily applied; it was rather a recommendation that one might get full returns in one year, rather than wait five years, just as a certain sum payable in one year was worth more to-day than if it could not be realized except by obtaining a part in each year for five years. Where the expense or trouble of application constituted a large proportion of the cost of manuring land, it was better policy to have it last longer. He had used the article known as Mapes' Superphosphate with very little if any benefit, and careful analyses have shown that of late this has deteriorated very much; what was sold last year being really worth only a quarter as much as that which was first put into market under the same name. None of the articles known by this title in commerce are simply superphosphate of lime, but rather composts, containing more or less of this substance mixed with ordinary phosphate of lime, (which is less soluble,) together with sulphate and carbonate of lime, and usually some Peruvian guano, or ammonia in some form, perhaps dried blood, and sometimes a considerable margin of inert matter.

The report was adopted.

Mr. Cargill, for committee on the causes and remedies of decay in fruit trees, (the tenth topic,) reported as follows:

"The subject is one that might be extended back a great number of years; but we suppose it was not intended to go farther back than 1855.

Much has been said and written, and many theories advanced concerning the decay of fruit trees since that time. Some of these theories have been derided by those who have given no better ones, and they in turn have been made the subjects of derision. If we succeed in giving a new theory, let no one deride it until he is willing to present one of his own. We ask no one to subscribe to our views until they give them, at least, more than a passing thought. We do not say that we can state accurately the cause or causes that have *caused* the trees to decay; but we will venture to give our opinion.

Your committee are of opinion that the 'prominent cause of the decay of our fruit trees' in the year 1855, was the severe drouth which commenced in 1854. The earth being much parched, there was not a sufficient quantity of moisture imparted to the roots to supply the trunk with sufficient sap, to be thrown out to the branches; the consequences were, that the branches were feeble

and drooping—not in a condition to resist the rigors of the following winter and spring, any more than a person whose constitution had been broken down would be prepared to withstand a fever. The trees having thus received a severe shock, which left them on the sick list, were an easy prey to whatever might befall them thereafter. Thus at the beginning of the last season, after the blossoms in many instances had put forth, there came a pinching frost, which took a strong hold of them. Many of them drooped and died. Others let fall the blossoms. A few brought forth poor fruit, and a *very few* are yet vigorous and bring forth fruit in abundance.

There is another cause, which we do not feel at liberty to overlook or pass over in silence; and that is injudicious pruning.

This opens a wide field for discussion, including the method of grafting, which is too often done by *bunglers*, who have a very inadequate idea (if any) of what they are doing. We have seen grafting done in such a manner as entirely to preclude the probability of the tree ever after being of any value, except for fuel.

Sometimes grafting is done in the lateral branches of the tree, so far from the trunk that it requires a forcing pump to send sap enough into them to keep them alive, leaving out the idea of their ever bearing fruit.

Perhaps it is expected that we shall say something about the decay that is so often experienced in the rearing of young trees when first set for an orchard. In the first place, many of the trees are killed, or nearly so, before they are set—having the top cut off, so that there is nothing to draw sustenance from the ground; and if, as in many instances is the case, rich soil and, at times, strong manures are placed at the roots, the sap is *forced* into the trunk, (which often resembles more an ox-goad than a fruit tree,) and, at times, there is a most luxuriant growth, which continues so late in the season that the wood does not get matured before the cold weather. In the following spring, many are disappointed; for when they look for the foliage which appeared so beautiful the fall before, lo! nothing is seen but withered *branches*. Those set in poor soil, having the top and lateral branches cut off in many instances, never show signs of life; or, if they do, they are so feeble that they might as well be dead.

There is another cause why many trees die after being set. That is the baking of the earth around them.

It being our duty to point out a remedy, we would say, the best remedy for the drouth is, to *mulch* the trees. There has not come

to our knowledge a single instance in which a tree was mulched, that died, or that did not bring forth fruit.

As to pruning—many trees being killed thereby—we think no novice in this business should be employed. We are convinced of this, from the fact that those which had been pruned most, suffered most. But few trees of *native* fruit were killed.

The question may be asked, what time is best for pruning trees? We would say, in the latter part of summer—as at that time the sap has so far hardened that it will not flow. This being the case, there will be no bleeding and no blackening on the tree. The wound will immediately heal, or, at least, will be one year in advance of those made in the spring.

The trees to be set, we think, should be as near their normal state as they conveniently can be.

We would recommend the following list of fruit trees as well adapted to our State, viz:

Early Fruit—Red Astracan, William's Favorite, Duchess of Oldenburg, Bell's Early, Mexico. *Fall Fruit*—Porter, American Summer Pearmain, Alexander, Franklin Sweet, Superb Sweet, Hubbardston Nonsuch, Fameuse, Wood's Sweet, Baker's Sweet, Late Bough, Late Strawberry, Winthrop Greening, Hurlburt, Nodhead, Mother. *Early Winter*—Beauty, Killam Hill, Greening, Ladies' Sweet, Minister. *Late Winter and Spring*—Red Russet, Northern Spy, Black Apple, Golden Russet, Roxbury Russet, Danvers Sweet, Blue Pearmain, Ribstone Pippin."

The report was adopted.

On motion of Mr. Percival, it was

Resolved, That fruit culture in Maine, demands the united and untiring efforts of every member of this Board, inasmuch as it is a settled fact that the luxuries of life and the wealth of the State would be largely increased thereby.

Mr. Porter, for committee on the establishment of market fairs, reported as follows:

"Your committee, having under consideration topic number eleven, viz: '*Resolved*, That this Board recognizes the importance of establishing market days or fairs, for the sale of agricultural products,' beg leave to report:

That agricultural market days or fairs, are simply large collections of the products of the farm, with a corresponding concourse of people, for the purpose of buying and selling agricultural products, and transacting other important business, for the mutual

advantage of each other. The name and custom are of European origin, where they have been established for centuries, with such marked success that they have long been considered indispensable. Their benefit to the farming community and others, who wish to buy or sell, or exchange stock or any other product of the farm, is very great. There, the different breeds of neat stock of every age and variety, of cattle, horses, sheep and swine, are exhibited in great numbers, and the purchaser can make any selection his fancy may dictate or his interest require. The great importance and convenience of such fairs, may be readily seen by the facilities for buying and selling, or otherwise exchanging, in hours, which would otherwise require weeks. In this country, where the population and stock are much less dense than in Europe, their beneficial results, probably, cannot be as great. Yet it is believed, in view of the value of well matched oxen, steers and horses, over those which are not, they would prove highly beneficial. In addition to the above, the farmers may exhibit samples of the different kinds of grain and dairy products they may have to sell, and the merchant wish to buy at a stipulated time and place—and thereby supersede the necessity of carrying them to a distant and uncertain market.

Your committee would not attempt to point out any definite course to be pursued upon this subject, but would recommend that this Board devise some plan to carry this object into effect."

The report was adopted.

The committee on twentieth topic submitted a report which gave rise to a somewhat protracted and animated discussion.

Mr. Anderson said the whole race of dogs should be exterminated. More damage was done by them in one year than the good the best of them effected in ten years. He spoke of the importance of encouraging the rearing of sheep. Small as the encouragement of exemption would be, gentlemen from the cities would be surprised to find of how much account it was with the poor persons concerned. He was strongly in favor of exempting a limited number of sheep from taxation, believing that many would thus be induced to keep them.

Mr. Bean defended the dog. He was of great benefit in Aroostook county, in protecting the sheep from bears. The watch dog was also highly valuable. A burglary was recently prevented by a faithful dog, and property saved greater than the value of all the sheep killed by dogs during the year past.

Mr. Chandler said that a dog of real value should be taxed like other objects of value. Very few, however, were of any value. The large majority were worthless, and many of them destructive. He had known a hundred sheep killed by dogs in one night. In the Insane Hospital was a boy who had been rendered idiotic by fright caused by a vicious dog. Were all the dogs in Christendom, and all the property they protected to be offset against damage like that? He knew a family of paupers whose sole possessions consisted of dogs.

Mr. Lancaster said he never found a man who would confess that his dog was vicious. He related a case in point. Having lost a sheep worth $10 by a dog which he saw kill the sheep, he complained to the owner, but the owner had more faith in the dog than in his testimony, and that was all the satisfaction he got. He would make a scale of taxation on dogs. For instance, he would tax one dog a dollar, the second, owned by the same man $5, and so on.

Mr. Anderson would not except even the shepherd-dog from taxation. Every man who has a dog which is really valuable can afford to be taxed for that as well as for other valuable animals.

Mr. Norton said that if shepherd dogs were exempted all dogs would become "shepherd dogs," as rum was converted from a beverage to "medicine."

Mr. Percival wanted to know how a dog, which was not worth a red cent, could be made available for taxation under the ordinary rules governing assessors of taxes.

Mr. Norton suggested they might be treated as "polls" not worth a cent—let them be taxed *specifically*, and not *ad valorem*. He thought a round tax on dogs would result in the saving of a thousand sheep annually.

Mr. Stackpole said the taxation of dogs would operate unequally on classes. In his section of country more poor men than rich ones owned dogs.

Mr. Dill said many persons keep them whose families suffer for bread.

Mr. Wasson said it was generally conceded that the dog was a most destructive animal. He believed more sheep were destroyed by them than by all other animals and by all diseases. The question was, which of the three modes was best to rid ourselves of this nuisance. One was by means of license. This, he thought, would be attended with difficulty, and would not be effectual.

Next, it was proposed to abate it as a nuisance. This was a mode, perhaps uncertain, and at least, one which neighbors did not like to resort to. The tax would be uniform, and the proper officers would have it in charge. He thought the latter the better mode. He moved that the report be recommitted with instructions to report a bill (for consideration of the Legislature) exempting five sheep from taxation, and providing a tax of $2 upon every dog kept.

Mr. Dill moved to amend so as to require a collar upon every dog's neck, with the name and residence of the owner thereon.

Mr. Percival thought the only way to collect a tax was by way of license to keep the dog. He also thought that if any sheep were to be exempted, the number should not be less than ten.

Mr. Rogers doubted the expediency of recommending legislation on the subject. He knew there were many very poor puppies both quadruped and biped; but feared the law would be a dead letter. He would encourage the raising of sheep in every feasible mode, but doubted if so small an inducement as removing a tax of about two cents on a sheep would effect much.

Mr. Goodale said the province of the Board was not to legislate. It could only suggest, and the Legislature must provide the law. He thought ten sheep, at least, should be exempt. If there were only 374,195 sheep in the State, as has been stated, there were less than six to a farmer. It was of great importance to increase this number, and if exemption from taxation would tend to do this, he would advocate it. He moved that the report be recommitted with instructions that the committee bring in a resolve expressive of the necessity of protection against dogs, and the propriety of favoring sheep husbandry, by legislation—leaving the mode to the wisdom of the Legislature; which motion prevailed—and the committee subsequently reported the following:

Resolved, That this Board recommend to the present Legislature the enactment of a law affording protection against dogs and also for the encouragement of sheep husbandry.

The resolve passed unanimously.

Mr. Cargill, for committee on bee culture (thirteenth topic) reported as follows:

"'Can the honey bee be made profitable to the farmers of Maine, and how?'

Perhaps a few facts in relation to the profit of the honey bee may be acceptable.

A farmer in the county of Kennebec, in the summer of 1854, had a hive of bees that in the month of June sent out a swarm which he put into a hive having four boxes that would contain from five to six pounds each, when filled. These were filled in less than ten days, and were taken from the hive and sold for $1 each. Other boxes were put in, but on the same day a swarm was sent out from this hive, which was sold for $5. The second set of boxes were filled and sold for $1 each. The swarm was sold for $5, without the hive. The old hive sent out a second swarm in twelve days after the first, which was sold for $5. Now we will gather up our items and see what will be the aggregate: and we have first, three swarms of bees, which actually sold for $5 each, making $15. Next eight boxes of honey, at $1 each, making $8, which, added to the $15, makes $23, from which we will deduct $1 for the two old fashioned hives, which any one will acknowledge is more than they are worth, and we have left a clear profit of $22 from an investment of $5. But some are ready to say this is an exception. We are ready to grant it, but are ready to make other statements, although the profit is not so great, yet sufficiently large to satisfy almost any person that the keeping of the '*honey bee*,' this little insect which our All-wise Father, in his bountiful goodness to the children of men, has given us may be made profitable.

It is usual, we think, for those who give their attention to the keeping of the bee, to have one good healthy swarm come out from each hive that has been well cared for during the winter, which is always worth $5, if it is early enough in the season for them to procure sufficient to live on through the coming winter. Then give the old swarm boxes to store the surplus honey in, which at a low estimate, may be reckoned at $5. Thus we shall get $10 as the profit.

Have we not answered the first part of the question in the affirmative? Do any gentlemen want more proof? If so we can furnish any amount.

The second part of the question, how? now claims our attention. We would say you must not be afraid of your bees. What, do you say we must not be afraid of being *stung*, when we have heard of such direful results from the poison that has been put into the system by the sting of the honey bee? If you have not enough of good common sense to mind your own business when you are amongst *bees*, we would advise you to keep away from them and let them alone. If any one feels that he must furnish himself

with a coat of mail and have it girt on, as closely as they did Saul's on David, when they wanted him to go out and meet Goliah, why we could not blame the bees if they should chase such an one into the house and quite down cellar. We have never found the least difficulty with our bees, when we have been familiar with them. If occasion requires, go amongst them with your coat off and sleeves rolled up. If in hiving any should need the helping hand, be not afraid to extend to them the naked hand, for in so doing they soon learn that you are their friend. Avoid all jerking movements. Let your moderation be known to all, particularly to the bees.

In the next place we say have good hives—such as show at once good common sense in regard to pattern. And as for materials and workmanship, let those points be well attended to. If there is any thing about the farm or kitchen garden that needs the real old pumpkin pine lumber in its construction, it is the bee hive. And in putting it together, let no wood butcher be employed, but let there be the best of joints and those well fastened, for it will be thoroughly tested by intense heat, and at times, severe cold. We are well aware that it used to be said in olden times 'the bees loved a rough house,' and if they did they got it. And what did they get besides? After they had worked hard early and late, during the entire summer, a hole would be dug in the ground, a fire made in it, with a large dose of brimstone on it and the rough house, as it was called, filled with the most industrious of all God's creation placed over it. If ever our souls melted at the doings of men pretending to be christians, they have over the barbarous treatment alluded to.

In conclusion we would say, if you want pleasure and profit combined, keep the 'honey bee.' Have them well protected from the burning rays of the sun at noonday, and if possible give them the morning sun."

The following resolves were introduced by Mr. Bean:

Resolved, That northern Maine offers better facilities for laboring men than any other part of the United States.

Mr. Dill presented one, as follows:

Resolved, That as one of the most direct means of developing the agricultural resources of the State, we recommend the opening of roads in the unsettled and fertile sections thereof, and in lotting out the State lands for settlement.

Mr. Bean remarked that large numbers of our young men annu-

ally leave us for the west, and many cling to cities and villages for a precarious support, who might find comfortable homes and ample remuneration for their labor in the new lands of Maine. To make a home in our northern forests, requires little investment of capital. The young man who goes into them has only to take with him an axe, and the will and ability to use it. With these he may secure for himself, in five years, a good farm, and comfortable buildings, and put himself on the road to competence. It was marvelous, considering the amount of information which had been scattered abroad on this subject, that so few persons availed themselves of the advantages which northern Maine afforded. With unexampled liberality the State extended a farm to each one of her sons who would take it. Nominally the settler has to pay fifty cents per acre, but the gift, with this condition, was better than it would be without it. The money is expended in road labor, for his own benefit—roads which he would be obliged to make if the condition was removed. The average size of lots, as they were surveyed by the State was 160 acres. For these the settler pays $80 in three yearly instalments. Where else in the United States could rich farms be purchased on such terms? The cost of clearing the land is from $10 to $12 per acre, and the first crop will generally exceed in value the cost of the land and clearing. The crop of oats is from 60 to 80 bushels. The crop of wheat in Aroostook might be calculated at 25 bushels per acre, while in the wheat growing regions of the west the average was but 12 bushels per acre. In northern Maine, wheat is worth $1.50 per bushel, while in the west it will bring only about one-third that sum.

In respect to health the advantages of northern Maine were infinitely superior to those of the prairie States. He had known many instances of persons being restored from feebleness to strength by change from the vapor laden regions near the sea to the dry climate of Aroostook.

Mr. Dill said nobody who is healthy, sober, industrious and steady in the pursuit of his calling as a farmer, could fail of getting a good living from the new lands of Maine. There were lands in and above Phillips, in Franklin county, on which men had accumulated large fortunes, and these men, leaving their farms to their sons, frequently settled down in large villages to loan money on interest. The lands in Rangely township were very productive, and had yielded rich rewards to those who worked them. So also of the Dead river regions. There were many sections of Oxford

and Franklin not yet subdued, which would make as good farming towns as Readfield or Winthrop. No. 3, in the 2d, 3d, 4th and 5th ranges in Franklin county were of this character. Rich intervals and splendid meadows abounded. He would add that he had known many a western emigrant to be disappointed in his hope of bettering his condition by leaving Maine, and to be obliged to write home for aid to keep him out of the almshouse.

Mr. Cushman went to Aroostook in 1833, and since that time had brought up his family comfortably and otherwise experienced a degree of prosperity that made him contented, although in the meantime he had lost $4,000 in milling and lumbering operations. His gains were the result of farming. He had lately been joined by old neighbors who, having followed mercantile pursuits without adequate reward, had at last turned to Aroostook farming to replenish their fortunes.

He said he knew of no other place in the United States where land is better than given away. But in northern Maine the settler is required to work out half a dollar per acre on the road, for his own accommodation; and for every fifty dollars so laid out, his farm is enhanced in value a hundred. He contended that in no other place, can the poor man begin farming with so good prospect of success. He could fell ten acres of trees before the hay and grain harvest. When that is finished, his trees may be burnt, and his clearing commence,—following it up until the ground is covered with snow, when he may have a large piece ready for the seed. Then he may assist in the neighboring lumbering operations, where wages are generally from $15 to $18 per month, in payment for which, supplies and seeds for the next season may be obtained and delivered on the spot. When seed time arrives, he may have his land all cleared, and with a few day's labor of a horse, or a pair of oxen, he can put his seed into the ground in a proper manner. Ten acres, which an industrious man can manage alone, will produce more corn, beans, grain and potatoes, than an average farm of one hundred acres in the older parts of the country. It will probably average about 40 bushels of oats, barley and buckwheat; 25 bushels of wheat and rye, and 250 bushels of potatoes per acre. Where else can as much be done with as little outlay? There is an abundance of timber for building and fencing purposes. Grasses of all kinds flourish abundantly, and in no place in Maine can stock of all kinds be kept cheaper. To the man who has been unfortunate in business, it holds out the unparalleled inducement of securing a

farm worth a thousand dollars, exempt from attachment and execution. It holds out an equal inducement to the man of capital. Land can be cleared for $10 per acre, and an average crop will sell for $20, and leave the land in condition to produce a handsome annual income, with but little outlay. The short distance from northern Maine to our extensive sea-coast, navigable rivers, and immense water power, must forever give her citizens the important advantages of cheap exports and imports, and a never failing market for all the products of the farm. How unlike the farming in the great west, where, although the soil is of great fertility, and easy of cultivation, yet, the distance from market is so great as to consume nearly, or quite its whole value, in transportation. The dazzling prospects, so constantly held out by the great west to the anxious emigrant, are very seldom realized. The bright side of the picture is presented, and the dark one veiled. We hear of nothing but beautiful fields of astonishing fertility: of large sheep and cattle, feeding in green pastures throughout the year, &c. But the whole story is not told. Nothing is said about fever and ague, almost poisonous water, venomous reptiles, and many other evils entirely unknown in Maine. These facts are plainly proved by those who have been there and returned, in disappointment, disgust, and poverty.

Mr. Lancaster said that nobody doubted that the virgin soils of Maine were highly productive. He would not offer a word in opposition to the eulogistic remarks in respect to northern Maine that had been offered. But he wanted to hear a little more of central Maine. It was just to the older parts of the State to say that there was probably little natural superiority of the Northern over the Southern or Central. When the new lands should be reduced by cropping, as the old lands had been, they would also need to be fertilized. There were peculiar advantages pertaining to the old as well as to the new settlements. One afforded cheaper lands and larger crops of particular kinds: in the other, certain crops were surer, the markets broader, and social privileges greater. The same degree of economy would be followed by as valuable returns, perhaps, in the old as in the new settlements.

Mr. Anderson said the last remark contained the admission that there was not the same degree of economy practiced in the old as in the new settlements. There was a vast amount of idleness and want of zeal incident to old societies, where drones were manufactured. But as a general rule, only the earnest and industrious seek

to improve their condition by subduing the forests and carving out homes for them. By a wise provision of Providence, zealous labor, where it is required to support life, never stays at that point, but goes steadily on, and always results in something more than a support for the man; while, on the other hand, laziness grows worse and worse until it brings up in the work-house.

Mr. Rogers said labor in Maine would command ample reward anywhere. He knew men in the poor (?) county of Sagadahoc, who began with the sole possession of an axe, and were now worth from two to five thousand dollars—the products of sedulous toil.

Mr. Cushman wanted no expression of discrimination. He only contended that northern Maine offered better inducements to settlers because its rich lands were offered to settlers free of cost.

Mr. Moore said there were as good lands in northern Somerset as anywhere else in Maine, and whatever of eulogy had been expressed of farming results by others at this Board would apply equally well to the valley of the Dead river. He knew several farms that yielded from $1200 to $2000 worth of hay, besides 1000 bushels of oats. One farm 110 miles from here, 15 from the Forks, and 9 miles from a settler, on Parlin pond, produced 60 tons of hay for market, besides what was used, 700 bushels oats, and quantities of potatoes. They raised 400 bushels Jackson potatoes on one acre. There is a farm at the Forks, (Mr. Burnham's,) where 100 tons of hay were marketed, at $15 per ton. Communication was direct from northern Somerset to Quebec by a good road. Fifteen miles this side of Canada line was a settlement at Moose river commenced by a man and his wife who left the northern limits of Kennebec years ago in winter time, taking all their goods, effects, and babies, that were hauled by the parents over the snow, the wife on snow shoes drawing the precious ones, and the husband the personal estate. They camped down in the wilderness, cleared their land, raised their numerous progeny, and secured a handsome property. In that region hay was worth from $16 to $24 a ton for the lumber market. It was true that many people had abandoned good lands in Somerset, sometimes because they were too indolent to comply with the conditions of success, sometimes from intemperance, and sometimes from too great a tendency to operate in lumbering. But the Dead river settlement was increasing in population, and would continue to augment as knowledge of its value for settling purposes should be extended.

Mr. Chandler corroborated the statements made by Mr. Dill, and

enlarged upon the resources of the new lands in Frankin county. He said in addition, that in comparing the condition of western farmers with that of our own there were some things not always taken into account. In the new settlements of the west, people lived miserably. He knew a well-to-do farmer in one of the western States who lived in a house containing but one room in which a family of ten lodged. At the time he saw the man he was sick and had a sick daughter; but the sick and the well all slept in the same room that contained the stove and the table. If our people would submit to western discomforts, they could have western success in Maine, without the drawbacks of bad health which emigrants from this State were pretty certain to find there.

Mr. True said he supposed the reason why the northern part of Maine is not settled as well as Vermont is, existed in the fact that there were not sufficient road connections with Canada. The extension of such facilities would result in developing northern Maine, and the policy should be encouraged. The superiority of this State over the west in respect to health was one that should not be lightly regarded. Returned emigrants from the west generally look sallow and weakly, while those who visit their old homes from the northern sections of Maine bring back ruddy faces and strong limbs. He was glad there was a prospect of increased facilities of communication.

Mr. Wasson introduced the following resolves:

Resolved, That in the opinion of this Board, the general practice of farmers in Maine has been to cover manure too deeply in the ground, and we recommend that surface manuring and top-dressing receive greater attention than hitherto.

Resolved, That where needful to secure the introduction of thorough-bred animals, it would be expedient for Societies to allow them to compete for first class premiums more than one year.

Resolved, That stock husbandry should become the leading feature of the agriculture of Maine, and that it should be the aim of farmers to ascertain and select such breeds as are best adapted to their circumstances and wants.

Mr. Chandler thought the first resolve touched a point of great importance, and one which needed more investigation. Two of his neighbors, of equal intelligence, contested the point strongly. One was sure that deep manuring was the true system. The other contended as earnestly for surface dressing. He had found that after plowing, the manure spread on the sward and harrowed in

had yielded good returns. He had tried top-dressing with good results.

Mr. Palmer said that observation and experience had taught him that if he had 20 cords of manure he would spread it in 3 inches deep; if he had 40 cords, would work it in 6 inches deep; if 80 cords, 9 inches, and if 100 cords, 12 inches. The depth depended very much upon the quantity of dressing.

Dr. True said there was no topic of more practical importance. It is easy for a farmer, with or without science, to run to extremes. If you have a strong granite soil and an abundance of manure, there is but little fear of going too deep. The manure should be incorporated with the soil, and not suffered to lie in a solid mass below.

Mr. Norton said that his experience had taught him that the long, strawy manure from the yard should not be spread on the surface. Old and fine manure should be thus spread. The heap in the yard should be frequently worked over—hauled out in the fall, and spread early in the spring. Different soils must be differently treated.

Mr. Rogers had experimented in the application of manures, and had derivêd great benefit by surface dressing on grass land. He composted manure in the fall—hauled out in the winter and spread on the snow. He knew of a worn out farm which had been made to yield five fold by surface manuring. The hay crop is one of the most important, and for this crop he approved of this mode. Where the land is plowed, the manure should be thoroughly incorporated with the soil.

Mr. Moulton said, that owing to the wire worm, a large portion of crops must be obtained from broken land. His plan was—about 10th of May, upon land cutting from one to one and a half tons to the acre, to spread about three-fifths of his coarse manure and turn it in under deep plowing, and in about ten days, after harrowing once, to spread the other two-fifths and then harrow again, and plant. At the end of six years with deep plowing, the soil will be as strong as at the end of three years with shoal plowing.

Mr. Hammatt said that the current practice needed amendment. He spoke from experience when he talked of the application of manures. With slight exception he had been a farmer all his life, and no man of his age had carted more manure. He was now satisfied that one half of all the manure he had ever employed was wasted by misapplication. He had long covered manure deeply.

Dr. Jackson, the Geologist, had told him formerly that this was the proper method and that the fertilizing gases rose to the surface. At length it occurred to him that nature might be a good teacher. He observed, and found that she deposited manures on the top of the ground. He tried her plan with great success, and when Dr. Jackson came along again, he confessed to have given up his old theory and adopted a new one. He had great confidence in top-dressing. For trees and vines whose roots reached far down, manure should perhaps be deposited below the surface, but for crops of all kinds it was sufficient to top-dress, and work in with the cultivator or harrow.

Mr. Goodale said there could be no universal rule. Different soils require different modes of culture. The question before us is, whether the *general* practice among farmers is to cover too deep. Most farmers would cover deeper in sandy than in clayey soils. He thought the general practice had been to cover deeper than is beneficial. He did not think the question was, how to make the land hold out the longest. If a given amount of manure can produce only a given amount of crop, the sooner the return is realized the better.

The proverb that a nimble sixpence is better than a slow shilling might be oftener applied in agricultural operations with benefit.

Mr. Wasson spoke upon the resolve relative to permitting stock to enter at fairs for first class premiums for more than one year. He said the usual rule prohibiting this, often operated injuriously. An individual, at great expense, procures a first class animal, and takes the first premium. He cannot again enter for it, and consequently sells him, and he is taken out of the county and perhaps out of the State. But little benefit is derived from the introduction, and an inferior animal soon takes his place.

Mr. Palmer thought the rule should be to let animals enter and receive the first premium till a better is found. In his county, by the other rule, they had driven one bull from the county which would now be worth $500 a year if he could be obtained.

Mr. Norton remarked that some people said that it was no use for them to try, if one stock animal was to enter year after year for the first premium. This had been their rule, but they had changed it one year and made the prohibition. The consequence was the loss of a very superior animal.

Mr. Percival spoke of stock husbandry and the importance of proper selections and care in rearing. Different breeds have each

its admirers. He was not exclusively partial to any one. But to insure success with any, both sire and dam should be good animals. The idea of getting good stock from mean animals was absurd. Calves, to be well raised, should be kept continuous in growing condition. Heifers should be milked when two years old, and be kept farrow the succeeding year, and milked as late as possible. Steers should be kept growing all the time, and trained when mere calves. Those thus trained were worth considerably more than such as were left to run wild until three years old, when a man was likely to break his neck in breaking them. He had various sheep, but preferred a cross from Merino bucks and Leicester ewes. The Merinos were small, not hardy enough for our climate, and not fit for market till two years old. The Leicesters were hardy and coarse wooled. The ewes fed their lambs well, which grew right on. But a cross the other way would result in large limbed lambs that would get little food, and so fail. In respect to cattle, the selection should be governed by the market, and full bloods were our sole reliance for their maintenance.

Mr. Anderson would recommend those who cultivated sheep near good markets to raise South Downs. They were not so large as the Leicesters and Cotswolds, but hardier and larger than Merinos. The wool was better than of the larger kinds, and finer than that of any except the Merinos, and the most is of a quality superior to that of either Leicester, or any of the long coarse wooled varieties. He thought too great importance had been given generally to size in animals, and that adaptation to the wants and means of the farmer was of more consequence. He quoted from an Agricultural Survey of Perth as follows:

"Every kind of pasture is fitted to raise animals to a particular size; when beasts of a larger size are brought in than the quality of food is calculated to support, these animals, whether cows, horses, sheep or any other kind, will degenerate apace, and never prove useful until they come down to the standard or size adapted to their situation and suited to their food. On the other hand, when a smaller breed than ordinary is brought in, they continue to increase in bulk until they come up to the pitch which is suited to their nourishment. But there is this remarkable difference betwixt the two progressions in respect to profit, that in the retrograde process, where animals are brought from rich pastures and a comfortable situation to the reverse, they are in every instance worse than the indigenous breed; whereas the animals which are brought

from worse to better continue to improve, till they arrive at that perfection which the change in their situation is calculated to produce."

He thought this principle was exemplified in Indian corn. By repeatedly planting here the Southern horse tooth or dent corn we find it every year diminishes in size and becomes more dense in its texture, until in time it is identical with the corn we generally raise; and so on the other hand, if we plant the small Canadian seed it will gradually increase in size until it reaches the standard prescribed by nature for our locality. The case with neat stock is somewhat analagous to this. By a wise provision of nature there is inherent in animals and vegetables a flexibility of organism which enables them to adapt themselves to a change of circumstances. And if a choice must be made between the relative sizes, it is better to take such as are smaller than the prevailing breeds, because they carry up a greater muscular development with cleaner limbs and diminished offal, while in the diminishing process it is first a reduction of muscle, consequently the animals have disproportionately large bones and go down with ragged joints.

He believed the original cattle introduced into New England were Devons. Of the seventeen ships that came over in 1630 bringing cattle, thirteen were from Devonshire and the adjacent counties, and directly from the region of Devon cattle. They had been bred without care and crossed with other races and breeds so indiscriminately, that there was now no reliance upon the best of them for breeding. He believed the true North Devon of two hundred years ago, purely and carefully bred ever since, and always selecting the best only for breeding, now offered the Maine farmer the best cattle for his use. They were a little larger than our common natives—the oxen often growing to measure seven feet—were very hardy, had a thick coat of hair,—active, and fed with ease upon ordinary or even dried-up pastures.

The Durhams originated in the richest parts of England, and were profitable only in rich localities. He was aware that for lumbering operations grade Durhams were extensively employed. Lumbermen liked large oxen. But there was more working power in the Devons, which were hardier, and supported at less expense. The fact that grades of Short-horn which inherit the hardiness of the native dams do better here than the full bloods, is a very significant one. Such was not the case with the Devons, for the full bloods were hardy enough and good enough for any uses.

By proper care breeders could direct Devons towards milk or beef, as they might desire, without going beyond the race. In England, Mr. Bloomfield, having the care of the estate of the Earl of Leicester, published a challenge in which he contemplated a trial of forty Devon cows against forty of any other race for milking qualities. The challenge was not accepted, and it came from a too important quarter to be overlooked. In this country, Mr. Patterson of Maryland, had shown that the Devons can be bred to be very deep milkers.

A late writer thus concludes one of a series of very able papers upon the several breeds of neat stock: "For grazing in rich levels or alluvial valley countries, the Durham Short-horn is indisputably the best; for the dairy in a similar country, the Ayrshire is superior; for the combination of working capacity and feeding properties, the Devonshire will be found preferable to either: and for the union of all qualities, working, milk yielding, and feeding, where the surface of the country is hilly, the soil not particularly fertile, and the climate not genial, the Devonshire cross will beat all others."

We all know that the Morgan horse is surpassed in size, in style, in weight, and in almost every single quality, when taken by itself, yet we all concur in pronouncing that the blood for Maine horses. Years of experience have proved his perfect adaptation to our soil and climate, to the broken surface of our country, and to our general wants and purposes. Why not adopt the same principles in choosing neat stock which have produced such happy results in our horses.

Mr. Goodale thought the importance of suiting our stock to the capacity of our lands so that it may be fully fed, was not generally appreciated. Agriculture might be likened to manufacture. From the soil, by applying manure and labor, (through the agencies of nature,) we *manufacture* crops—we *make* corn, potatoes, &c. And so animals may be looked upon as machines: and as with other machines, it costs something to keep them running. A cow or an ox requires a certain amount of food to supply the constant waste of the system, and another amount to support animal heat. These must be supplied at any rate. If more food is given, it may be converted into meat or milk, and is profit. The greater the amount of food which any animal can thoroughly digest and assimilate over and above the quantity required to keep the machine in good running condition, the greater the profit in the shape of increased

weight, or a greater flow of milk. It might sometimes be worth while to secure large size in working oxen at a considerable expense for extra food; but for the production of meat or milk, wool, &c., size is of very little importance *compared with the capability of giving the largest returns in proportion to the amount of food consumed.*

The resolves were passed; also several others complimentary to the officers and to the reporters for the newspaper press, and on the 27th of January the Board adjourned *sine die.*

MEISEL BROS LITH BOSTON

PRIZE SOUTH DOWN RAMS.

BRED BY JONAS WEBB BABRAHAM-CAMBRIDGE, ENGLAND.

The object of the husbandman, like that of men engaged in other avocations, is *profit*; and like other men the farmer may expect success proportionate to the skill, care, judgment and perseverance with which his operations are conducted.

The better policy of farmers generally, is to make stock husbandry in some one or more of its departments a leading aim—that is to say, while they shape their operations according to the circumstances in which they are situated, these should steadily embrace the conversion of a large proportion of the crops grown into animal products,—and this because, by so doing, they may not only secure a present livelihood, but best maintain and increase the fertility of their lands.

The object of the stock grower is to obtain the most valuable returns from his vegetable products. He needs, as Bakewell happily expressed it, "the best *machine* for converting herbage and other animal food into money."

He will therefore do well to seek such animals as are most perfect of their kind—such as will pay best for the expense of procuring the machinery, for the care and attention bestowed, and for the consumption of raw material. The returns come in various forms. They may or may not be connected with the ultimate value of the animal. In the beef ox and the mutton sheep, they are so connected to a large extent; in the dairy cow and the fine wooled sheep, this is quite a secondary consideration;—in the horse, valued as he is for beauty, speed and draught, it is not thought of at all.

Not only is there a wide range of field for operations, from which the stock grower may select his own path of procedure, but there is a demand that his attention be directed *with a definite aim*, and *towards an end clearly apprehended*. The first question to be answered, is, what do we want? and the next, how shall we get it?

What we want, depends wholly upon our situation and surroundings, and each must answer it for himself. In England the problem to be solved by the breeder of neat cattle and sheep is how "to produce an animal or a living machine which with a certain quantity and quality of food, and under certain given circumstances, shall

yield in the shortest time the largest quantity and best quality of beef, mutton or milk, with the largest profit to the producer and at least cost to the consumer." But this is not precisely the problem for Maine farmers to solve, because our circumstances are different. Few, if any, here grow oxen for beef alone, but for labor and beef, so that earliest possible maturity may be omitted and a year or more of labor profitably intervene before conversion to beef. Many cultivators of sheep, too, are so situated as to prefer fine wool, which is incompatible with the largest quantity and best quality of meat. Others differently situated in regard to a meat market would do well to follow the English practice and aim at the most profitable production of mutton. A great many farmers, not only of those in the vicinity of large towns, but of those at some distance, might, beyond doubt, cultivate dairy qualities in cows, which as a general thing, have been sadly neglected in years past, and this too, even, if necessary, at the sacrifice, to considerable extent, of beef making qualities.

Whatever may be the object in view, it should be clearly apprehended and striven for with persistent and well directed efforts. To buy or breed common animals of mixed qualities and use them for any and for all purposes is too much like a manufacturer of cloth procuring some carding, spinning and weaving machinery, adapted to no particular purpose but can somehow be used for any, and attempting to make fabrics of cotton, of wool, and of linen with it. I do not say that cloth would not be produced, but he would assuredly be slow in getting rich by it.

The stock grower needs not only to have a clear and definite aim in view, but also to understand the means by which it may best be accomplished. Among these means a knowledge of the principles of breeding holds a prominent place, and this is not of very easy acquisition by the mass of farmers. The experience of any one man would go but a little way towards acquiring it, and there has not been much published on the subject in any form within the reach of most. I have been able to find nothing like an extended systematic treatise on the subject either among our own, or the foreign agricultural literature which has come within my notice. Indeed, from the scantiness of what appears to have been written, coupled with the fact that much knowledge must exist somewhere, one is tempted to believe that not all which might have done so, has yet found its way to printers' ink. That a great deal has been acquired, we know, as we know a tree—by

its fruits. That immense achievements have been accomplished is beyond doubt.

The improvement of the domestic animals of a country so as greatly to enhance their individual and aggregate value, and to render the rearing of them more profitable to all concerned, is surely one of the achievements of advanced civilization and enlightenment, and is as much a triumph of science and skill as is the construction of a railroad, a steamship, an electric telegraph, or any work of architecture. If any doubt this, let them ponder the history of those breeds of animals which have made England the stock nursery of the world, the perfection of which enables her to export thousands of animals at prices almost fabulously beyond their value for any purpose but to propagate their kind: let them note the patient industry, the genius and application which have been put forth to bring them to the condition they have attained, and their doubts must cease.

Robert Bakewell of Dishley, was one of the first of these improvers. Let us stop for a moment's glance at him. Born in 1725, on the farm where his father and grandfather had been tenants, he began at the age of thirty to carry out the plans for the improvement of domestic animals upon which he had resolved as the results of long and patient study and reflection. He was a man of genius, energy and perseverance. With sagacity to conceive and fortitude to perfect his designs, he laid his plans and struggled against many disappointments, amid the ridicule and predictions of failure freely bestowed by his neighbors,—often against serious pecuniary embarrassments; and at last was crowned by a wonderful degree of success. When he commenced letting his rams, (a system first introduced by him and adhered to during his life, in place of selling,) they brought him 17*s.* 6*d.* each, for the season. This was ten years after he commenced his improvements. Soon the price came to a guinea, then to two or three guineas—rapidly increasing with the reputation of his stock, until in 1784, they brought him 100 guineas each! Five years later his lettings for one season amounted to $30,000!

With all his skill and success he seemed afraid lest others might profit by the knowledge he had so laboriously acquired. He put no pen to paper and at death left not even the slightest memorandum throwing light upon his operations, and it is chiefly through his cotemporaries, who gathered somewhat from verbal communications, that we know anything regarding them. From these we

learn that he formed an ideal standard in his own mind and then endeavored, first by a wide selection and a judicious and discriminating coupling, to obtain the type desired, and then by close breeding, connected with rigorous weeding out to perpetuate and fix it.

After him came a host of others, not all of whom concealed their light beneath a bushel. By long continued and extensive observation, resulting in the collection of numerous facts, and by the collation of these facts of nature, by scientific research and practical experiments, certain physiological laws have been discovered, and principles of breeding have been deduced and established. It is true that some of these laws are as yet hidden from us, and much regarding them is but imperfectly understood. What we don't know is a deal more than what we do know, but to ignore so much as has been discovered and is well established, and can be learned by any who care to do so, and to go on regardless of it, would indicate a degree of wisdom in the breeder on a par with that of a builder who should fasten together wood and iron just as the pieces happened to come to his hand, regardless of the laws of architecture, and expect a convenient house or a fast sailing ship to be the result of his labors.

Is not the usual course of procedure among many farmers too nearly parallel to the case supposed? Let the ill-favored, chance-bred, mongrel beasts in their barn yards testify. The truth is, and it is of no use to deny or disguise the fact, the *improvement* of domestic animals is one of the most important and to a large extent, one of the most neglected branches of rural economy. The fault is not that farmers do not keep stock enough, much oftener they keep more than they can feed to the most profitable point, and when a short crop of hay comes, there is serious difficulty in supporting them, or in selling them at a paying price; but the great majority neither bestow proper care upon the selection of animals for breeding, nor do they appreciate the dollars and cents difference between such as are profitable and such as are profitless. How many will hesitate or refuse to pay a dollar for the services of a good bull when some sort of a calf can be begotten for a quarter? and this too when one by the good male would be worth a dollar more for veal and ten or twenty dollars more when grown to a cow or an ox? How few will hesitate or refuse to allow to a butcher the cull of his calves and lambs for a few extra shillings, and this when the butchers difference in shillings would soon, were

the best kept and the worst sold, grow into as many dollars and more? How many there are who esteem *size* to be of more consequence than symmetry, or adaptation to the use for which they are kept? How many ever sit down to calculate the difference in money value between an animal which barely pays for keeping, or perhaps not that, and one which pays a profit?

Let us reckon a little. Suppose a man wishes to buy a cow. Two are offered him, both four years old, and which might probably be serviceable for ten years to come. With the same food and attendance the first will yield for ten months in the year, an average of five quarts per day, that being not far from the yield of a majority of the cows in the State,—and the other for the same term will yield seven quarts and of equal quality. What is the comparative value of each? The difference in yield is six hundred quarts. For the purpose of this calculation we will suppose it worth three cents per quart—amounting to eighteen dollars. Is not the second cow, while she holds out to give it, as good as the first, and three hundred dollars at interest besides? If the first just pays for her food and attendance, the second, yielding two-fifths more, pays *forty per cent. profit* annually; and yet how many farmers having two such cows for sale would make more than ten or twenty or at most, thirty dollars difference in the price? The profit from one is eighteen dollars a year—in ten years one hundred and eighty dollars, besides the annual accumulations of interest—the profit of the other is—nothing. If the seller has need to keep one, would he not be wiser to give away the first, than to part with the second for a hundred dollars?

Suppose, again, that an acre of grass or a ton of hay costs five dollars, and that for its consumption by a given set of animals, the farmer gets a return of five dollars worth of labor, or meat, or wool, or milk. He is selling his crop at cost, and makes no profit. Suppose by employing other animals, better horses, better cows, oxen and sheep, he can get ten dollars per ton in returns. How much are the latter worth more than the former? Have they not doubled the value of the crops, and increased the profit of farming from nothing to a hundred per cent? Except that the manure is not doubled and the animals might not live always, could he not as well afford to give the price of his farm for one set as to accept the other as a gift?

Among many, who are in fact ignorant of what goes to constitute merit in a breeding animal, there is an inclination to treat as

imaginary and unreal the higher values placed upon well-bred animals over those of mixed origin, unless they are larger and handsomer in proportion to the price demanded. The sums paid for qualities which are not at once apparent to the eye are stigmatized as *fancy prices*. It is not denied that fancy prices are sometimes, perhaps often paid, for there are probably few who are not willing occasionally to pay dearly for what merely pleases them aside from any other merit commensurate to the price.

But, on the other hand, it is fully as true that great intrinsic value for breeding purposes may exist in an animal and yet make very little show. Such an one may not even look so well to a casual observer, as a grade, or cross-bred animal, which although valuable as an individual, is not, for breeding purposes, worth a tenth part as much.

Let us suppose two farmers to need a bull; they go to seek and two are offered, both two years old, of similar color, form and general appearance. One is offered for twenty dollars—for the other a hundred is demanded. Satisfactory evidence is offered that the latter is no better than any or all of its ancestors for many generations back on both sides, or than its kindred—that it is of a pure and distinct breed, that it possesses certain well known hereditary qualities, that it is suited for a definite purpose, it may be a Shorthorn, noted for large size and early maturity, it may be a Devon, of fine color and symmetry, active and hardy, it may be an Ayrshire, noted for dairy qualities, or of some other definite breed, whose uses, excellencies and deficiencies are all well known.

The other is of no breed whatever, perhaps it is called a grade or a cross. The man who bred it had rather confused ideas, so far as he had any, about breeding, and thought to combine all sorts of good qualities in one animal, and so he worked in a little grade Durham or Hereford to get size, and a little Ayrshire for milk, and a little Devon for color, and so on, using perhaps dams sired by a bull in the neighborhood which had also got some "Whitten" or "Peter Waldo" calves, (though none of these showed it,) at any rate he wanted some of the "native" element in his stock, because it was tough, and some folks thought natives were the best after all. Among its ancestors and kindred were some good and some not good, some large and some small, some well favored and fat, some ill favored and lean, some profitable and some profitless. The animal now offered is a great deal better than the average of them. It looks for aught they can see, about as well as the one for which

five times his price is asked. Perhaps he served forty cows last year and brought his owner as many quarters, while the other only served five and brought an income of but five dollars. The question arises, which is the better bargain? After pondering the matter, one buys the low-priced and the other the high-priced one, both being well satisfied in their own minds.

What did results show? The low-priced one served that season perhaps a hundred cows; more than ought to have done so, came a second time;—having been overtasked as a yearling, he lacked somewhat of vigor. The calves came *of all sorts*, some good, some poor, a few like the sire, more like the dams—all mongrels and showing mongrel origin more than he did. There seemed in many of them a tendency to combine the defects of the grades from which he sprung rather than their good points. In some, the quietness of the Short-horn degenerated into stupidity, and in others the activity of the Devon into nervous viciousness. Take them together they perhaps paid for rearing, or nearly so. After using him another year, he was killed, having been used long enough.

The other, we will say, served that same season a reasonable number, perhaps four to six in a week, or one every day, not more. Few came a second time and those for no fault of his. The calves bear a striking resemblance to the sire. Some from the better cows look even better in some points, than himself and few much worse. There is a remarkable uniformity among them; as they grow up they thrive better than those by the low priced one. They prove better adapted to the use intended. On the whole they are quite satisfactory and each pays annually in their growth, labor or milk a profit over the cost of food and attendance of five or ten dollars or more. If worked enough to furnish the exercise needful to insure vigorous health, he may be as serviceable and as manageable at eight or ten years old, as at two; meantime he has got, perhaps, five hundred calves, which in due time become worth ten or twenty dollars each more than those from the other. Which now seems the wiser purchase? Was the higher estimate placed on the well bred animal based upon fancy or upon intrinsic value?

It is from a conviction of the necessity of generally giving increased attention to selection in the breeding of domestic animals in order to render our system of agriculture more profitable, and with the hope of contributing somewhat to this end that I attempt in the following remarks to set forth as well as my resources will permit, some of the physiological principles involved in the breed-

ing of domestic animals, or in other words, the laws which govern hereditary transmission, and so result in the production of breeds and varieties; and the first and most important of these, is the

Law of Similarity.—It is by virtue of this law that the peculiar characters, qualities and properties of the parents, whether external or internal, good or bad, healthy or diseased, are transmitted to their offspring. This is one of the plainest and most certain of the laws of nature. Children resemble their parents, and they do so because these are hereditary. The law is constant. Within certain limits progeny always and every where resembles their parents. If this were not so, there would be no constancy of species, and a horse might beget a calf or a sow have a litter of puppies, which is never the case,—for in all time we find repeated in the offspring the structure, the instincts and all the general characteristics of the parents and never those of another species. Such is the law of nature and hence the axiom that "like produces like." But while experience teaches the constancy of hereditary transmission, it teaches just as plainly that the constancy is not absolute and perfect, and this introduces us to another law, viz:—that of variation, which will be considered by and bye; our present concern is to ascertain what we can of the law of similarity.

The lesson which this law teaches might be stated in five words, to wit: *Breed only from the best*—but the teaching may be more impressive and will more likely be heeded if we understand the extent and scope of the law.

Facts in abundance show the hereditary tendency of physical, mental and moral qualities in men, and very few would hesitate to admit that the external form and general characteristics of parents descend to children in both the human and brute races; but not all are aware that this law reaches to such minute particulars as facts show to be the case.

We see hereditary transmission of a peculiar type, upon an extensive scale, in some of the distinct races, the Jews and the Gypsies for example. Although exposed for centuries to the modifying influences of diverse climates, to association with peoples of widely differing customs and habits, they never merge their peculiarities in those of any people with whom they dwell, but continue distinct. They retain the same features, the same figures, the same manners, customs and habits. The Jew in Poland, in Austria, in London, or in New York, is the same; and the money-changers of the Temple at Jerusalem in the time of our Lord may be seen to-

day on change in any of the larger marts of trade. How is this? Just because the Jew is a "thorough-bred." There is with him no intermarriage with the Gentile—no crossing, no mingling of his organization with that of another. When this ensues "permanence of race" will cease and give place to variations of any or of all sorts.

Some families are remarkable during long periods for tall and handsome figures and striking regularity of features, while in others a less perfect form, or some peculiar deformity reappears with equal constancy. A family in Yorkshire is known for several generations to have been furnished with six fingers and toes. A family possessing the same peculiarity resides in the valley of the Kennebec in this State, and the same has reappeared in one or more other families connected with it by marriage.

The thick upper lip of the imperial house of Austria, introduced by the marriage of the Emperor Maximillian with Mary of Burgundy, has been a marked feature in that family for hundreds of years, and is visible in their descendants to this day. Equally noticeable is the "Bourbon nose" in the former reigning family of France. All the Barons de Vessins had a peculiar mark between their shoulders, and it is said that by means of it a posthumous son of a late Baron de Vessins was discovered in a London shoemaker's apprentice.

Haller cites the case of a family where an external tumor was transmitted from father to son which always swelled when the atmosphere was moist.

A remarkable example of a singular organic peculiarity and of its transmission to descendants, is furnished in the case of the English family of "Porcupine men," so called, from having all the body except the head and face, and the soles and palms, covered with hard dark-colored excrescences of a horny nature. The first of these was Edward Lambert, born in Suffolk in 1718, and exhibited before the Royal Society when fourteen years of age. The other children of his parents were naturally formed; and Edward, aside from this peculiarity, was good looking and enjoyed good health. He afterwards had six children, all of whom inherited the same formation, as did also several grand-children.

Numerous instances are on record showing that even accidents do sometimes, although not usually, become hereditary. Blumenbach mentions the case of a man whose little finger was crushed and twisted by an accident to his right hand. His sons inherited

right hands with the little finger distorted. A bitch had her hinder parts paralyzed for some days by a blow. Six of her seven pups were deformed, or so weak in their hinder parts that they were drowned as useless. A pregnant cat got her tail injured; in each of her five kittens the tail was distorted, and had an enlargement or knob near the end of each. Horses marked during successive generations with red-hot irons in the same place transmit visible traces of such marks to their colts.

Very curious are the facts which go to show that even acquired habits sometimes become hereditary. Pritchard, in his "Natural History of Man," says that the horses bred on the table lands of the Cordilleras "are carefully taught a peculiar pace which is a sort of running amble;" that after a few generations this pace becomes a natural one; young untrained horses adopting it without compulsion. But a still more curious fact is that if these domesticated stallions breed with mares of the wild herd, which abound in the surrounding plains, they "become the sires of a race in which the ambling pace is natural and requires no teaching."

Mr. T. A. Knight, in a paper read before the Royal Society, says, "the hereditary propensities of the offspring of Norwegian ponies, whether full or half-bred, are very singular. Their ancestors have been in the habit of *obeying the voice* of their riders and *not the bridle*; and horse-breakers complain that it is impossible to produce this last habit in the young colts. They are, however, exceedingly docile and obedient, when they understand the commands of their masters."

A late writer in one of the foreign journals, says that he "had a puppy taken from its mother at six weeks old, who although never taught to 'beg' (an accomplishment his mother had been taught) spontaneously took to begging for every thing he wanted when about seven or eight months old; he would beg for food, beg to be let out of the room, and one day was found opposite a rabbit hutch begging for the rabbits."

If even in such minute particulars as these, hereditary transmission may be distinctly seen, it becomes the breeder to look closely to the "like" which he wishes to see reproduced. Judicious selection is indispensable to success in breeding, and this should have regard to *every particular*—general appearance, length of limb, shape of carcass, development of chest; if in cattle, the size, shape and position of udder, thickness of skin, "touch," length and texture of hair, docility, &c., &c.; if in horses, their adaptation to

any special excellence depending on form, or temperament, or nervous energy.

Not only should care be taken to avoid *structural defects*, but especially to secure freedom from *hereditary diseases*, as both defects and diseases appear to be more easily transmissible than desirable qualities. There is often no obvious peculiarity of structure or appearance indicating the possession of diseases or defects which are transmissible, and so special care and continued acquaintance is necessary in order to be assured of their absence in breeding animals; but such a tendency although invisible or inappreciable to cursory observation, must still, judging from its effects, have as real and certain an existence, as any peculiarity of form or color.

Every one who believes that a disease may be hereditary at all, must admit that certain individuals possess certain tendencies which render them especially liable to certain diseases, as consumption or scrofula; yet it is not easy to say precisely in what this predisposition consists. It seems probable, however, that it may be due either to some want of harmony between different organs, some faulty formation or combination of parts, or to some peculiar physical or chemical condition of the blood or tissues; and that this altered state, constituting the inherent congenital tendency to the disease, is duly transmitted from parent to offspring like any other quality more readily apparent to observation. Hereditary diseases exhibit certain eminently characteristic phenomena, which a late writer* enumerates as follows:

1. "They are transmitted by the male as well as by the female parent, and are doubly severe in the offspring of parents both of which are affected by them.

2. They develop themselves not only in the immediate progeny of one affected by them, but also in many subsequent generations.

3. They do not, however, always appear in each generation in the same form; one disease is sometimes substituted for another, analagous to it, and this again after some generations becomes changed into that to which the breed was originally liable—as phthisis (consumption) and dysentery. Thus, a stock of cattle previously subject to phthisis, sometimes become affected for several generations with dysentery to the exclusion of phthisis, but by and by, dysentery disappears to give place to phthisis.

* Finlay Dun, Member Royal College of Veterinary Surgeons, in Journal of the Royal Agricultural Society.

4. Hereditary diseases occur to a certain extent independently of external circumstances; appearing under all sorts of management, and being little affected by changes of locality, separation from diseased stock, or such causes as modify the production of non-hereditary diseases.

5. They are, however, most certainly and speedily developed in circumstances inimical to general good health, and often occur at certain, so called, critical periods of life, when unusual demands on the vital powers take place.

6. They show a striking tendency to modify and absorb into themselves all extraneous diseases: for example, in an animal of consumptive constitution, pneumonia seldom runs its ordinary course, and when arrested, often passes into consumption.

7. Hereditary diseases are less effectually treated by ordinary remedies than other diseases. Thus, although an attack of phthisis, rheumatism or opthalmia may be subdued, and the patient put out of pain and danger, the tendency to the disease will still remain and be greatly aggravated by each attack.

In horses and neat cattle, hereditary diseases do not usually show themselves at birth, and sometimes the tendency remains latent for many years, perhaps through one or two generations and afterwards breaks out with all its former severity."

The diseases which are found to be hereditary in horses are scrofula, rheumatism, rickets, chronic cough, roaring, ophthalmia or inflammation of the eye,—grease or scratches, bone spavin, curb, &c. Indeed, Youatt says, "there is scarcely a malady to which the horse is subject, that is not hereditary. Contracted feet, curb, spavin, roaring, thick wind, blindness, notoriously descend from the sire or dam to the foal."

The diseases which are found hereditary in neat cattle are, scrofula, consumption, dysentery, diarrhea, rheumatism and malignant tumors. Facts also render it probable that the recently imported lung murrain, called pleuro pneumonia, is also of this character. Neat cattle being less exposed to the exciting causes of disease, and less liable to be overtasked or exposed to violent changes of temperature, or otherwise put in jeopardy, their diseases are not so numerous, and what they have are less violent than in the horse, and generally of a chronic character.

Scrofula is not uncommon among sheep, and it presents itself in various forms. Sometimes it is connected with consumption; sometimes it affects the viscera of the abdomen, and particularly

the mesenteric glands in a manner similar to consumption in the lungs. The scrofulous taint has been known to be so strong as to affect the fœtus, and lambs have occasionally been born with it, but much oftener they show it at an early age, and any affected in this way are liable to fall an easy prey to any ordinary or prevailing disease which develops in such with unusual severity. Sheep are also liable to several diseases of the brain and of the respiratory and digestive organs. Epilepsy, or "fits," and rheumatism sometimes occur.

Swine are subject to nearly the same hereditary diseases as sheep. Epilepsy is more common with them than with the latter, and they are more liable to scrofula than any other domestic animals.

When properly and carefully managed, swine are not ordinarily very liable to disease, but when, as too often kept in small, damp, filthy styes, and obliged constantly to inhale noxious effluvia, and to eat unsuitable food, we cannot wonder either that they become victims of disease or transmit to their progeny a weak and sickly organization. Swine are not naturally the dirty beasts which many suppose. "Wallowing in the mire," so proverbial of them, is rather from a wish for protection from insects and for coolness, than from any inherent love of filth, and if well cared for they will be comparatively cleanly.

The practice of close breeding, which is probably carried to greater extent with swine than with any other domestic animal, undoubtedly contributes to their liability to hereditary diseases, and when those possessing any such diseases are coupled, the ruin of the stock is easily and quickly effected, for as already stated, they are propagated by either parent, and always most certainly and in most aggravated form, when occurring in both.

With regard to hereditary diseases, it is eminently true that "an ounce of prevention is worth a pound of cure." As a general and almost invariable rule, animals possessing either defects or a tendency to disease should not be employed for breeding. If, however, for special reasons it seems desirable to breed from one which has some slight defect of symmetry, or a faint tendency to disease, although for the latter it is doubtful if the possession of any good qualities can fully compensate, it should be mated with one which excels in every respect in which the other is deficient, and on no account with one which is near of kin to it.

Notwithstanding the importance due to the subject of hereditary diseases, it is also true that few diseases invariably owe their de-

velopment to hereditary causes. Even such as are usually hereditary are sometimes produced accidentally, (as of course there must be a beginning to everything,) and in such case, they may, or may not be, transmitted to their progeny. As before shown, it is certain that they sometimes are, which is sufficient reason to avoid such for breeding purposes. It is also well known that in the horse for instance, certain forms of limbs predispose to certain diseases, as bone spavin is most commonly seen where there is a disproportion in the size of the limb above and below the hock; and others might be named of similar character; in all such cases the disease may be caused by an agency which would be wholly inadequate in one of more perfect form, but once existing, it is liable to be reproduced in the offspring—all tending to show the great importance of *giving due heed* in selecting breeding animals *to all qualities, both external and internal,* so long as "like produces like."

Law of Variation.—We come now to consider another law, by which that of similarity is greatly modified, to wit, the law of variation or divergence. All organic beings, whether plants or animals, possess a certain flexibility or pliancy of organization, rendering them capable of change to a greater or less extent. When in a state of nature variations are comparatively slow and infrequent, but when in a state of domestication they occur much oftener and to a much greater extent. The greater variability in the latter case is doubtless owing, in some measure, to our domestic productions being reared under conditions of life not so uniform, and different from, those to which the parent species was exposed in a state of nature.

Flexibility of organization in connexion with climate, is seen in a remarkable degree in Indian corn. The small Canada variety, growing only three feet high and ripening in seventy to ninety days when carried southward, gradually enlarges in the whole plant until it may be grown twelve feet high and upwards, and requires one hundred and fifty days to ripen its seed. A southern variety brought northward, gradually dwindles in size and ripens earlier until it reaches a type specially fitted to its latitude.

Variation, although the same in kind, is greater in degree, among domesticated plants than among animals. From the single wild variety of the potato as first discovered and taken to Europe, have sprung innumerable sorts. Kemp, in his work on Agricultural Physiology, tells us, that on the maratime cliffs of England, there

exists a little plant with a fusiform root, smooth glaucous leaves, flowers similar to wild mustard and of a saline taste. It is called by botanists, *Brassica oleracea*. By cultivation there have been obtained from this insignificant and apparently useless plant—

1st, all Borecoles or Kails, 12 varieties or more.

2d, all cabbages having heart.

3d, the various kinds of Savoy cabbages.

4th, Brussels sprouts.

5th, all the Broccolis and Cauliflowers which do not heart.

6th, the rape plant.

7th, the ruta baga or Swedish turnip.

8th, yellow and white turnips.

9th, Hybrid turnips.

10th, Kohl Rabbi.

Similar examples are numerous among our common useful plants, and among flowers the dahlia and verbena furnish an illustration of countless varieties, embracing numberless hues and combinations of color, from purest white through nearly all the tints of the rainbow to almost black, of divers hights too, and habits of growth, springing up under the hand of cultivation in a few years from plants which at first yielded only a comparatively unattractive and self-colored flower. In brief, it may be said, that nearly or quite all the choicest productions both of our kitchen and flower gardens are due to variations induced by cultivation in a course of years from plants which in their natural condition would scarcely attract a passing glance.

We cannot say what might have been the original type of many of our domestic animals, for the inquiry would carry us beyond any record of history or tradition regarding it, but few doubt that all our varieties of the horse, the ox, the sheep and the dog, sprang each originally from a single type, and that the countless variations are due to causes connected with their domestication. Of those reclaimed within the period of memory may be named the turkey. This was unknown to the inhabitants of the old continent until discovered here in a wild state. Since then, having been domesticated and widely disseminated, it now offers varieties of wide departure from the original type, and which have been nurtured into self-sustaining breeds, distinguished from each other by the possession of peculiar characteristics.

Among what are usually reckoned the more active causes of variation may be named climate, food and habit.

Animals in cold climates are provided with a thicker covering of hair than in warmer ones. Indeed, it is said that in some of the tropical provinces of South America, there are cattle which have an extremely rare and fine fur in place of the ordinary pile of hair. Various other instances could be cited, if necessary, going to show that a beneficent Creator has implanted in many animals, to a certain extent, a *power of accommodation* to the circumstances and conditions amid which they are reared.

The *supply of food*, whether abundant or scanty, is one of the most active cases of variation known to be within the control of man. For illustration of its effect, let us suppose two pairs of twin calves, all as nearly alike as possible, and let a male and a female from each pair be suckled by their mothers until they wean themselves, and be fed always after with plenty of the most nourishing food; and the others to be fed with skimmed milk, hay tea and gruel at first, to be put to grass at two months old, and subsequently fed on coarse and innutritious fodder. Let these be bred from separately, and the same style of treatment kept up, and not many generations would elapse before we had distinct varieties, or breeds, differing materially in size, temperament and time of coming to maturity.

Suppose other similar pairs, and one from each to be placed in the richest blue-grass pastures of Kentucky, or in the fertile valley of the Tees; always supplied with abundance of rich food, these live luxuriously, grow rapidly, increase in hight, bulk, thickness, every way, they early reach the full size which they are capable of attaining; having nothing to induce exertion, they become inactive, lazy, lethargic and fat. Being bred from, the progeny resemble the parents, "only more so." Each generation acquiring more firmly and fixedly the characteristics induced by their situation, these become hereditary, and we by and by have a *breed* exhibiting somewhat of the traits of the Teeswater or Durhams from which the improved Short-horns of the present day have been reared.

The others we will suppose to have been placed on the hill-sides of New England, or on the barren Isle of Jersey, or on the highlands of Scotland, or in the pastures of Devonshire. These being obliged to roam longer for a scantier repast grow more slowly, develop their capabilities in regard to size not only more slowly, but, perhaps, not fully at all—they become more active in temperament and habit, thinner and flatter in muscle. Their young cannot so soon shift for themselves and require more milk, and the dams

yield it. Each generation in its turn becomes more completely and fully adapted to the circumstances amid which they are reared, and if bred indiscriminately with any thing and every thing else, we by and by have the common mixed cattle of New England, miscalled natives; or if kept more distinct, we have something approaching the Devon, the Ayrshire, or the Jersey breeds.

A due consideration of the natural effect of climate and food is a point worthy the special attention of the stock-husbandman. If the breeds employed be well adapted to the situation, and the capacity of the soil is such as to feed them fully, profit may be safely calculated upon. Animals are to be looked upon as machines for converting herbage into money. Now it costs a certain amount to keep up the motive power of any machine, and also to make good the wear and tear incident to its working; and in the case of animals it is only so much as is digested and assimilated, *in addition to the amount thus required*, which is converted into meat, milk or wool; so that the greater the proportion which the latter bears to the former, the greater will be the *profit* to be realized from keeping them.

There has been in New England generally a tendency to choose animals of large size, as large as can be had from any where, and if they possess symmetry and all other good qualities commensurate with the size, and if plenty of nutritious food can be supplied, there is an advantage gained by keeping such, for it costs less, other things being equal, to shelter and care for one animal than for two. But our pastures and meadows are not the richest to be found any where, and if we select such as require, in order to give the profit which they are capable of yielding, more or richer food than our farms can supply, or than we have the means to purchase, we must necessarily fail to reap as much profit as we might by the selection of such as could be easily fed upon home resources to the point of highest profit.

Whether the selection be of such as are either larger or smaller than suit our situation, they will, and equally in both cases, vary by degrees towards the fitting size or type for the locality in which they are kept, but there is this noteworthy difference, that if larger ones be brought in, they will not only diminish, but deteriorate, while if smaller be brought in, they will enlarge *and improve.*

The bestowal of food sufficient both in amount and quality to enable animals to develop all the excellencies inherent in them, and to obtain all the profit to be derived from them, is something very dis-

tinct from undue forcing or pampering. This process may produce wonderful animals to look at, but neither useful nor profitable ones, and there is danger of thus producing a most undesirable variation, for, as in plants, we find that forcing, pampering, high culture or whatever else it may be called, may be carried so far as to result in the production of double flowers, (an unnatural development,) and these accompanied with greater or less inability to perfect seed, so in animals, the same process may be carried far enough to produce sterility. Instances are not wanting, and particularly among the more recent improved Short-horns, of impotency among the males and of barrenness in the females, and in some cases where they have borne calves they have failed to secrete milk for their nourishment.* Impotency in bulls of various breeds has not unfrequently occurred from too high feeding, and especially if connected *with lack of sufficient exercise.*†

Habit has a decided influence towards inducing variation. As the blacksmith's right arm becomes more muscular from the habit of exercise induced by his vocation, so we find in domestic animals that use, or the demand created by habit, is met by a development or change in the organization adapted to the requirement. For instance, with cows in a state of nature or where required only to suckle their young, the supply of milk is barely fitted to the requirement. If more is desired, and if the milk be drawn completely and regularly, the yield is increased and continued longer. By keeping up the demand there is induced in the next generation a greater development of the secreting organs, and more milk is given. By continuing the practice, by furnishing the needful conditions of suitable food, &c., and by selecting in each generation those animals showing the greatest tendency towards milk, a breed specially adapted for the dairy may be established. It is just by this mode that the Ayrshires have, in the past eighty or a hundred years, been brought to be what they are, a breed giving more good milk upon a given quantity of food than any other.

It is because the English breeders of modern Short-horns altogether prefer beef-making to milk-giving properties that they have constantly fostered variation in favor of the one at the expense of

* See Rowley's Prize Report on Farming in Derbyshire, in Journal of Royal Agricultural Society, Vol. 14.

† A *working bull*, though perhaps not so pleasing to the eye as a fat one, (for fat sometimes covers a multitude of defects,) is a surer stock-getter; and his progeny is more likely to inherit full health and vigor.

the other until the milking quality in many families is nearly bred out. It was not so formerly—thirty years ago the Short-horns (or as they were then usually called, the Durhams) were not deficient in dairy qualities, and some families were famous for large yield. By properly directed efforts they might, doubtless, be bred back to milk, but of this there is no probability, at least in England, for the tendency of modern practice is very strong towards having each breed specially fitted to its use—the dairy breeds for milk and the beef breeds for meat only. The requirements of the English breeder are in some respects quite unlike those of New England farmers—for instance, as they employ no oxen for labor there is no inducement to cultivate working qualities even, in connection with beef.

As an illustration of the effect of habit, Darwin cites the domestic duck, of which he says, "I find that the bones of the wing weigh less, and the bones of the leg more, in proportion to the whole skeleton, than do the same bones in the wild duck; and I presume that this change may be safely attributed to the domestic duck flying much less and walking more than its wild parent." And again, "not a single domestic animal can be named which has not in some country drooping ears, and the view suggested by some authors, that the drooping is due to the disuse of the muscles of the ear, from the animals not being much alarmed by danger, seems probable."

Climate, food and habit are the principal causes of variation which are known to be in any marked degree under the control of man; and the effect of these is, doubtless, in some measure indirect and subservient to other laws, of reproduction, growth and inheritance, of which we have at present very imperfect knowledge. This is shown by the fact that the young of the same litter sometimes differ considerably from each other, though both the young and their parents have apparently been exposed to exactly the same conditions of life; for had the action of these conditions been specific or direct and independent of other laws, if any of the young had varied, the whole would probably have varied in the same manner.

Numberless hypotheses have been started to account for variation. Some hold that it is as much the function of the reproductive system to produce individual differences as it is to make the child like the parents.

Darwin in his "Origin of Species," says "the reproductive system is eminently susceptible to changes in the conditions of life; and to this system being functionally disturbed in the parents I chiefly attribute the varying or plastic condition of the offspring. The male and female sexual elements seem to be affected before that union takes place which is to form a new being. But why, because the re-productive system is disturbed this or that part should vary more or less, we are profoundly ignorant. Nevertheless we can here and there dimly catch a faint ray of light, and we may feel sure that there must be some cause for each deviation of structure however slight."

It may be useless for us to speculate here upon the laws which govern variations. The fact that these exist is what the breeder has to deal with, and a most important one it is, for it is this chiefly, which makes hereditary transmission the problem which it is. His aim should ever be *to grasp and render permanent and increase so far as practicable, every variation for the better, and to reject for breeding purposes such as show a downward tendency.*

That this may be done, there is abundant proof in the success which has in many instances attended the well directed efforts of intelligent breeders. A remarkable instance is furnished in the new Mauchamp-Merino sheep of Mons. Graux, which originated in a single animal, a product of the law of variation, and which by skillful breeding and selection has become an established breed of a peculiar type and possessing valuable properties. Samples of the wool of these sheep were shown at the great exhibition in London, in 1851, and attracted much attention. It was also shown at the great recent Agricultural Exhibition at Paris. A correspondent of the *Mark Lane Express*, says:

"One of the most interesting portions of the sheep-show is that of the Mauchamp variety of Merinos, having a new kind of wool, glossy and silky, similar to mohair. This is an instance of an entirely new breed being as it were created from a mere sport of nature. It was originated by Mons. J. L. Graux. In the year 1828, a Merino ewe produced a peculiar ram lamb, having a different shape from the usual Merino, and possessing a long, straight, and silky character of wool. In 1830, M. Graux obtained by this ram one ram and one ewe, having the silky character of wool. In 1831, among the produce were four rams and one ewe with similar

fleeces; and in 1833 there were rams enough of the new sort to serve the whole flock of ewes. In each subsequent year the lambs were of two kinds; one possessing the curled elastic wool of the old Merinos, only a little larger and finer; the other like the new breed. At last, the skillful breeder obtained a flock combining the fine silky fleece with a smaller head, broader flanks, and more capacious chest; and several flocks being crossed with the Mauchamp variety, have produced also the Mauchamp-Merino breed. The pure Mauchamp wool is remarkable for its qualities as combing-wool, owing to the strength, as well as the length and fineness of the fibre. It is found of great value by the manufacturers of Cashmere shawls and similar goods, being second only to the true Cashmere fleece, in the fine flexible delicacy of the fibre; and when in combination with Cashmere wool, imparting strength and consistency. The quantity of the wool has now become as great or greater than from ordinary Merinos, while the quality commands for it twenty-five per cent. higher price in the French market. Surely breeders cannot watch too closely any accidental peculiarity of conformation or characteristic in their flocks or herds."

Mons. Vilmorin, the eminent horticulturist of Paris, has likened the law of similarity to the centripetal force, and the law of variation to the centrifugal force; and in truth their operations seem analogous, and possibly they may be the same in kind, though certainly unlike in this, that they are not reducible to arithmetical calculation and cannot be subjected to definite measurement. His thought is at least a highly suggestive one and may be pursued with profit.

Among the "faint rays" alluded to by Mr. Darwin as throwing light upon the changes dependent on the laws of reproduction, there is one, perhaps the brightest yet seen, which deserves our notice. It is the apparent influence of the male first having fruitful intercourse with a female upon her subsequent offspring by other males. Attention was first directed to this by the following circumstance, related by Sir Everard Home: A young chestnut mare, seven-eighths Arabian, belonging to the Earl of Morton, was covered in 1815 by a Quagga, which is a species of wild ass from Africa, and marked somewhat in the style of a Zebra. The mare was covered but once by the Quagga, and after a pregnancy of eleven months and four days gave birth to a hybrid, which had, as was expected, distinct marks of the Quagga, in the shape of its head, black bars on the legs and shoulders, &c. In 1817, 1818 and

1821, the same mare was covered by a very fine black Arabian horse, and produced successively three foals, and although she had not seen the Quagga since 1816, they all bore his curious and unequivocal markings.

Since the occurrence of this case numerous others have been observed, a few of which may be mentioned. Mr. McGillivray says, that in several foals in the royal stud at Hampton Court, got by the horse "Actæon," there were unmistakable marks of the horse "Colonel." The dams of these foals were bred from by Colonel the previous year.

A colt, the property of the Earl of Suffield, got by "Laurel," so resembled another horse, "Camel," that it was whispered and even asserted at Newmarket that he must have been got by "Camel." It was ascertained, however, that the mother of the colt bore a foal the previous year by "Camel."

Alexander Morrison, Esq., of Bognie, had a fine Clydesdale mare which in 1843 was served by a Spanish ass and produced a mule. She afterwards had a colt by a horse, which bore a very marked likeness to a mule—seen at a distance, every one sets it down at once as a mule. The ears are nine and one-half inches long,—the girth not quite six feet, stands above sixteen hands high. The hoofs are so long and narrow that there is a difficulty in shoeing them, and the tail is thin and scanty. He is a beast of indomitable energy and durability, and highly prized by his owner.

Numerous similar cases are on record,* and it appears to have been known among the Arabs for centuries, that a mare which has first borne a mule, is ever after unfit to breed pure horses;† and the fact seems now to be perfectly well understood in all the mule-breeding States of the Union.

A pure Aberdeenshire heifer, the property of a farmer in Forgue, was served with a pure Teeswater bull to which she had a first cross calf. The following season the same cow was served with a pure Aberdeenshire bull, the produce was in appearance a cross-bred calf, which at two years old had long horns; the parents were both hornless.

A small flock of ewes, belonging to Dr. W. Wells in the island of Grenada, were served by a ram procured for the purpose;—the

* It was long ago stated by Haller, that when a mare had a foal by an ass and afterwards another by a horse, the second offspring begotten by the horse nevertheless approached in character to a mule.

† See Abd el Kader's letter.

ewes were all white and woolly; the ram was quite different,—of a chocolate color, and hairy like a goat. The progeny were of course crosses, but bore a strong resemblance to the male parent. The next season, Dr. Wells obtained a ram of precisely the same breed as the ewes, but the progeny showed distinct marks of resemblance to the former ram, in color and covering. The same thing occurred on neighboring estates under like circumstances.

Six very superior pure-bred black-faced horned ewes, belonging to Mr. H. Shaw of Leochel-Cushnie, were served by a Leicester ram, (white-faced and hornless.) The lambs were crosses. The next year they were served by a ram of exactly the same breed as the ewes themselves. To Mr. Shaw's astonishment the lambs were without an exception hornless and brownish in the face, instead of being black and horned. The third year (1846) they were again served by a superior ram of their own breed, and again the lambs were mongrels, but showed less of the Leicester characteristics than before. Mr. Shaw at last parted from these fine ewes without obtaining a single pure-bred lamb.*

"It has been noticed that a well bred bitch, if she have been impregnated by a mongrel dog, will not although lined subsequently by a pure dog, bear thorough-bred puppies in the next two or three litters."†

The like occurrence has been noticed in respect of the sow. "A sow of the black and white breed became pregnant by a boar of the wild breed of a deep chestnut color. The pigs produced were duly mixed, the color of the boar being in some very predominant. The sow being afterwards put to a boar of the same breed as herself, some of the produce were still stained or marked with the chestnut color which prevailed in the first litter and the same occurred after a third impregnation, the boar being then of the same kind as herself. What adds to the force of this case is that in the course of many years' observation the breed in question was never known to produce progeny having the slightest tinge of chestnut color.‡

The above are a few of the many instances on record tending to show the influence of a first impregnation upon subsequent progeny by other males. Not a few might also be given showing that

* Journal of Medical Science, 1850.
† Kirke's Physiology.
‡ Philosophical Transactions for 1821.

the same rule holds in the human species, of which a single one will suffice here:—"A young woman residing in Edinburgh, and born of white parents, but whose mother previous to her marriage bore a mulatto child by a negro man servant, exhibits distinct traces of the negro. Dr. Simpson, whose patient at one time, the young woman was, recollects being struck with the resemblance, and noticed particularly that the hair had the qualities characteristic of the negro."

Dr. Carpenter, in the last edition of his work on physiology, says it is by no means an infrequent occurrence for a widow who has married again to bear children resembling her first husband.

Various explanations have been offered to account for the facts observed, among which the theory of Mr. McGillivray, V. S., which is endorsed by Dr. Harvey, and considered (as we shall presently see) as very probable at least by Dr. Carpenter, seems the most satisfactory. Dr. Harvey says:

"Instances are sufficiently common among the lower animals where the offspring exhibit more or less distinctly over and beyond the characters of the male by which they were begotten, the peculiarities also of a male by which their mother at some former period had been impregnated. * * * Great difficulty has been felt by physiological writers in regard to the proper explanation of this kind of phenomena. They have been ascribed by some to a permanent impression made somehow by the semen of the first male on the genitals and more particularly on the ova of the female:* and by others to an abiding influence exerted by him on the imagination and operating at the time of her connection subsequently with other males and perhaps during her pregnancy; but they seem to be regarded by most physiologists as inexplicable.

Very recently, in a paper published in the Aberdeen Journal, a Veterinary Surgeon, Mr. James McGillivray of Huntley, has offered an explanation which seems to me to be the true one. His theory is that "*when a pure animal of any breed has been pregnant to an animal of a different breed, such pregnant animal is a cross ever after, the purity of her blood being lost in consequence of her connec-*

* The late Dr. Cuming, V. S., of New Brunswick, once remarked to the writer, that it might be due to the fact that the nerves of the uterus, which before the first impregnation were in a rudimentary state, were developed under a specific influence from the semen of the first male, and that they might retain so much of a peculiar style of development as to impress upon future progeny by other males the likeness of the first.

tion with the foreign animal, herself BECOMING A CROSS FOREVER, *incapable of producing a pure calf of any breed."*

Dr. Harvey believes "that while as all allow, a portion of the mother's blood is continually passing by absorption and assimilation into the body of the fœtus, in order to its nutrition and development, a portion of the blood of the fœtus is as constantly passing in like manner into the body of the mother; that as this commingles there with the general mass of the mother's own blood, it inoculates her system with the constitutional qualities of the fœtus, and that, as these qualities are in part derived to the fœtus from the male progenitor, the peculiarities of the latter are thereby so ingrafted on the system of the female as to be communicable by her to any offspring she may subsequently have by other males."

In support of this view, Mr. McGillivray cites a case in which there was presented unmistakable evidence that the organization of the placenta admits the return of the venous blood to the mother; and Dr. Harvey, with much force, suggests that it is analagous to the known fact that constitutional syphilis has been communicated to a female who never had any of the primary symptoms. Regarding the occurrence of such phenomena, Dr. Harvey under a later date says: "since then I have learned that many among the agricultural body in this district are familiar to a degree that is annoying to them with the facts then adduced in illustration of it, finding that after breeding crosses, their cows though served with bulls of their own breed yield crosses still or rather mongrels; that they were already impressed with the idea of contamination of blood as the cause of the phenomenon; that the doctrine so intuitively commended itself to their minds as soon as stated, that they fancied they were told nothing but what they knew before, so just is the observation that truth proposed is much more easily perceived than without such proposal is it discovered."*

Dr. Carpenter, speaking of phenomena analagous to what are here alluded to, says:

"Some of these cases appear referable to the strong impression left by the first male parent upon the female; but there are others which seem to render it more likely that the blood of the female has imbibed from that of the fœtus, through the placental circulation, some of the attributes which the latter has derived from its male parent, and that the female may communicate these, with

*Edinburgh Journal Medical Science, 1849.

those proper to herself, to the subsequent offspring of a different male parentage. This idea is borne out by a great number of important facts. * * * As this is a point of great practical importance it may be hoped that those who have the opportunity of bringing observation to bear upon it, will not omit to do so."

In the absence of more general and accurate observations directed to this point, it is impossible to say to what extent the first male produces impression upon subsequent progeny by other males. There can be no doubt, however, but that such an impression is made. The instances where it is of so marked and obvious a character as in some of those just related may be comparatively few, yet there is abundant reason to believe, that although in a majority of cases the effect may be less noticeable, it is not less real, and demands the special attention of all breeders.

Whether this result is to be ascribed to inoculation of the system of the female with the characteristics of the male through the fœtus, or to any other mode of operation, it is obviously of great advantage for every breeder to know it and thereby both avoid error and loss and secure profit. It is a matter which deserves thorough investigation and the observations should be minute and have regard not only to peculiarities of form, but also to qualities and characteristics not so obvious; for instance there may be greater or less hardiness, endurance or aptitude to fatten. These may be usually more dependent on the dam, but the male is never without a degree of influence upon them, and it is well established that aptitude to fatten is usually communicated by the Short-horn bull to crosses with cattle of mixed or mongrel origin which are often very deficient in this desirable property.

Mr. McGillivray says: "A knowledge of the fact must be of the greatest benefit to the breeder in two ways, positively and negatively. I have known very great disappointment and loss result from allowing an inferior male to serve a first rate female—the usefulness of such female being thereby forever destroyed. As for the positive benefits arising from the inoculation—they are obvious to any unbiased mind. The black polled and Aberdeenshire cattle common to this country (Scotland) may be, and often are, improved by the following plan: Select a good, well formed, and healthy heifer—put her, in proper season, to a pure Short-horn bull: after the calf to this Durham bull, breed from the cow with bulls of her own breed; occasionally, and most likely the first time,

a red calf ultimately having horns will appear even from the polled bull and cow; but in general the calves will be of the same type with the polled parents but with many points improved, and an aptitude to fatten, to come earlier to maturity, &c., such as no one of the pure polled or Aberdeenshire breed ever exhibited in this country, or any other country, however well kept, previous to the introduction of the Short-horn breed. The offspring of these breeds thus improved, when bred from again, will exhibit many points and qualities of excellence similar to the best crosses but retaining much of the hardiness of the original stock, no mean consideration for this changeable and often severe climate. And, moreover, such crosses,—for they are crosses—will command high prices as improved polled or Aberdeenshire cattle. I happen to know of a case where a farmer, from a distance purchased a two year old heifer of the stamp referred to, for the purpose of improving his polled cattle, and for this heifer he paid fifty guineas!"—($250.)

The knowledge of this law* gives us a clue to the cause of many of the disappointments of which practical breeders often complain and to the cause of many variations otherwise unaccountable, and it suggests particular caution as to the first male employed in the

* A very striking fact may be related in this connection, which while it may or may not have a practical bearing on the breeding of domestic animals, shows forcibly how mysterious are some of the laws of reproduction. It is stated by the celebrated traveler, Count de Strzelecki, in his Physical Description of New South Wales and Van Dieman's Land. "Whenever," he says, "a fruitful intercourse has taken place between an aboriginal woman and an European male, that aboriginal woman is forever after incapable of being impregnated by a male of her own nation, although she may again be fertile with a European." The Count, whose means and powers of observation are of the highest possible order, affirms that "hundreds of instances of this extraordinary fact are on record in the writer's memoranda all recurring invariably under the same circumstances, all tending to prove that the sterility of the female, which is relative only to one and not to the other male is not accidental, but follows laws as cogent though as mysterious as the rest of those connected with generation." The Count's statement is endorsed by Dr. Maunsell of Dublin, Dr. Carmichael of Edinburgh, and the late Prof. Goodsir, who say they have learned from independent sources that as regards Australia, Strzelecki's statement is unquestionable and must be regarded as the expression of a law of nature. The law does not extend to the negro race, the fertility of the negro female not being apparently impaired by previous fruitful intercourse with a European male.

In reply to an inquiry made whether he had ever noticed exceptional cases, the Count says: "It has not come under my cognizance to see or hear of a native female which having a child with a European had afterwards any offspring with a male of her own race."

The Count's statement is suggestive as to the disappearance of the aborigines of some countries. This has often been the subject of severe comment and is generally ascribed to the rum and diseases introduced by the white man. It would now appear that other influences have also been operative.

coupling of animals, a matter which has often been deemed of little consequence in regard to cattle, inasmuch as fewer heifers' first calves are reared, than of such as are borne subsequently.

Another faint ray of light touching the causes of variation is afforded us by the fact that the qualities of offspring are not only dependent on the habitual conditions of the parents, but also upon any peculiar condition existing at the time of sexual congress. For instance, the offspring of parents ordinarily healthy and temperate, but begotten in a fit of intoxication, would be likely to suffer permanently, both physically and mentally, from the condition which the parents had temporarily brought upon themselves. On the other hand, offspring begotten of parents in an unusually healthy and active condition of body and mind, would likely be unusually endowed both mentally and physically. The Arabs in breeding horses take advantage of this fact, for before intercourse, both sire and dam are actively exercised, not to weariness, but sufficiently to induce the most vigorous condition possible. Of this, too, we have proof in the phenomenon sometimes observed by breeders, that a strong mental impression made upon the female by a particular male, will give the offspring a resemblance to him, even though she have no sexual intercourse with him. Of this, Mr. Boswell in his prize essay published in 1828, gives a remarkable instance. He says that Mr. Mustard of Angus, one of the most intelligent breeders he had ever met with, told him that one of his cows chanced to come into season while pasturing on a field bounded by that of one of his neighbors, out of which field an ox jumped and went with the cow until she was brought home to the bull. The ox was white, with black spots, and horned. Mr. Mustard had not a horned beast in his possession, nor one with any white on it. Nevertheless, the produce of the following spring was a black and white calf with horns.

The case of Jacob is often quoted in support of this view, and although many believe some miraculous agency to have been exerted in his case, and though he could say with truth, "God hath taken away the cattle of your father and given them to me," it seems, on the whole, more probable, inasmuch as supernatural agency may never be presumed, except where we know, or have good reason to believe, that natural causes are insufficient, that God "gave" them, as he now gives to some, riches or honors: that is to say, by virtue of the operation of natural laws. If all who keep cattle would exercise a tithe of the patriarch's shrewdness and

sagacity in improving their stock, we should see fewer ill-favored kine than at present.

The possibility of some effect being produced by a strong impression at the time of conception, is not to be confounded with the popular error that "marks" upon an infant* are due to a transient, although strong impression upon the imagination of the mother at any period of gestation, which is unsupported by facts and absurd; but there are facts sufficient upon record to prove that *habitual* mental condition, and especially at an early stage of pregnancy, *may* have the effect to produce some bodily deformity, and should induce great caution.

Atavism, or Ancestral Influence.—It may not be easy to say whether this phenomenon should be considered more properly in connection with the law of similarity, or with that of variation. Youatt, in his work on cattle published by the Society for the Diffusion of Useful Knowledge, inclines to the former. He speaks of it as showing the universality of the application of the axiom that "like produces like"—that when this "may not seem to hold good, it is often because the lost resemblance to generations gone by is strongly revived." In common experience its occurrence has, at least, the appearance of variation, and practically it matters little whether it be considered under one head or the other. The phenomenon, or law, as it is sometimes called,† of atavism, or ancestral influence, is one of considerable practical importance, and well deserves careful attention by the breeder of farm stock.

Every one is aware that it is nothing unusual for a child to resemble its grandfather or grandmother or some ancestor still farther back, more than it does either its own father or mother. The fact is too familiar to require the citing of examples. We find the same occurrence among our domestic animals, and oftener in proportion as the breeds are crossed or mixed up. Among our common stock of neat cattle, (*natives*, as they are often called,) originating as they have from animals brought from England, Scotland, Denmark, France and Spain, each possessing different characteristics of form, color and use; and bred, as our common stock has usually been, indiscriminately together, with no special point in view, no attempt to obtain any particular type or form, or to secure adaptation for any particular purpose, we have very frequent opportunities of

* Carpenter's Physiology, new edition, page 783.

† From the Latin Atavus—meaning any ancestor indefinitely, as a grandmother's great grandfather.

witnessing the results of the operation of this law of hereditary transmission. So common indeed is its occurrence, that the remark is often made, that however good a cow may be, there is no telling beforehand what sort of a calf she may have.

The fact is sufficiently obvious that certain peculiarities often lie dormant for a generation or two and then reappear in subsequent progeny. Stockmen often speak of it as "breeding back," or "crying back." The cause of this phenomenon we may not fully understand. A late writer says, "it is to be explained on the supposition that the qualities were transmitted by the grandfather to the father in whom they were *masked* by the presence of some antagonistic or controlling influence, and were thence transmitted to the son in whom the antagonistic influence being withdrawn they manifest themselves. A French writer on Physiology says, "if there is not inheritance of paternal characteristics, there is at least an *aptitude* to inherit them, a disposition to reproduce them; and there is always a transmission of this aptitude to some new descendants, among whom these traits will manifest themselves sooner or later."* Mr. Singer, let us say, has a remarkable aptitude for music; but the influence of Mrs. Singer is such that their children inheriting her imperfect ear, manifest no musical talent whatever. These children however have inherited the disposition of the father in spite of its non-manifestation; and if, when they transmit what in them is latent, the influence of their wives is favorable, the grandchildren may turn out musically gifted.

The lesson taught by the law of atavism is very plain. It shows the importance of seeking "thorough-bred" or "well-bred" animals; and by these terms are simply meant such as are descended from a line of ancestors in which for many generations the desirable forms, qualities and characteristics have been *uniformly shown*. In such a case, even if ancestral influence does come in play, no material difference appears in the offspring, the ancestors being all essentially alike. From this point we perceive in what consists the money value of a good "pedigree." It is in the evidence which it brings that the animal is descended from a line all the individuals of which were alike, and excellent of their kind, and so is almost sure to transmit like excellencies to its progeny in turn;—not that

* "S'il n'y a pas héritage des caractères paternels il y a donc au moins *aptitude* à en hériter, disposition à les reproduire, et toujours cette transmission de cette aptitude à des noveau descendants, chez lesquels ces mêmes caractères se manifesteront tôt ou tard."—*Longet's* "*Traite de Physiologie*," ii: 133.

every animal with a long pedigree full of high-sounding names is necessarily of great value as a breeder, for in every race or breed, as we have seen while speaking of the law of variation, there will be here and there some which are less perfect and symmetrical of their kind than others; and if such be bred from, they may likely enough transmit undesirable points; and if they be mated with others possessing similar failings, they are almost sure to deteriorate very considerably.

Pedigree is valuable in proportion as it shows an animal to be descended, not only from such as are purely of its own race or breed, but also from such individuals in that breed as were specially noted for the excellencies for which that particular breed is esteemed. Weeds are none the less worthless because they appear among a crop consisting chiefly of valuable plants, nor should deformed or degenerate plants, although they be true to their kind, ever be employed to produce seed. If we would have good cabbages or turnips, it is needful to select the most perfect and the soundest to grow seed from, and to continue such selection year after year.

The pertinacity with which hereditary traits cling to the organization in a latent, masked or undeveloped condition for long after they might be supposed to be wholly "bred out" is sometimes very remarkable. What is known among breeders of Short-horns as the "Galloway alloy," although originating by the employment for only once of a single animal of a different breed, is said to be traceable even now, after many years, in the occasional development of a "smutty nose" in descendants of that family.

Many years ago there were in Kennebec county a few polled or hornless cattle. They were not particularly cherished, and gradually diminished in numbers. Mr. Payne Wingate shot the last animal of this breed, (a bull calf or a yearling,) mistaking it in the dark for a bear. During thirty-five years subsequently all the cattle on his farm had horns, but at the end of that time one of his cows produced a calf which grew up without horns, and Mr. Wingate said it was, in all respects, the exact image of the first bull of the breed brought there.

Probably the most familiar exemplification of clearly marked ancestral influence among us, is to be found in the ill-begotten, round-breeched calves occasionally, and not very unfrequently, dropped by cows of the common mixed kind, and which, if killed early, make very blue veal, and if allowed to grow up, become the

most profitless and unsatisfactory beasts to be found in the land; the heifers being often sterile, the cows always poor milkers, the oxen unthrifty, dull, mulish beasts, yielding flesh of very dark color, ill flavor and destitute of fat. They are known by various names in different localities, in Maine as the "Whitten" and "Peter Waldo" breed, in Massachusetts as "Yorkshire" and "Westminster," in New York as the "Pumpkin buttocks," in England as "*lyery*" or "*lyery* Dutch," &c., &c.

Those in northern New England are believed to be descended chiefly from a bull brought from Watervliet, in the vicinity of Albany, New York, more than forty years ago, (in 1818,) by the Shakers at Alfred, in York county, and afterwards transferred to their brethren in Cumberland county. No one who has proved the worthlessness of these cattle can readily believe that any bull of this sort would have been knowingly kept for service since the first one brought into the State, and yet it is by no means a rare occurrence to find calves dropped at the present time bearing unmistakable evidence of that origin.

It seems likely that this disagreeable peculiarity was first brought into the country by means of some of the early importations of Dutch or of the old Durham breed.

Culley, in speaking of the Short-horns, inclines to the opinion that they were originally from Holland, and himself recollected men who in the early part of their lives imported Dutch cattle into the county of Durham, and of one Mr. Dobinson he says, he was noted for having the best breed of Short-horns of any and sold at high prices. "But afterwards some other persons of less knowledge, going over, brought home some bulls that introduced the disagreeable kind of cattle called *lyery* or *double lyered*, that is, black-fleshed. These will feed to great weight, but though fed ever so long will not have a pound of fat about them, neither within or without, and the flesh (for it does not deserve to be called beef) is as black and coarse grained as horse flesh. No man will buy one of this kind if he knows any thing of the matter, and if he should be once taken in he will remember it well for the future; people conversant with cattle very readily find them out by their round form, particularly their buttocks, which are turned like a black coach horse, and the smallness of the tail; but they are best known to the graziers and dealers in cattle by the *feel* or *touch* of the fingers; indeed it is this nice touch or feel of the hand that in a great measure constitutes the judge of cattle."

Relative influence of the Male and Female Parents. The relative influence of the male and female parents upon the characteristics of progeny has long been a fertile subject of discussion among breeders. It is found in experience that progeny sometimes resembles one parent much more than the other,—sometimes there is an apparent blending of the characteristics of both,—sometimes a noticeable dissimilarity to either, though always more or less resemblance somewhere, and often, the impress of one may be distinctly seen upon a portion of the organization of the offspring and that of the other parent upon another portion; yet we are not authorized from such discrepancies to conclude that it is a matter of chance, for all of nature's operations are conducted by fixed laws, whether we be able fully to discover them or not. The same causes always produce the same results. In this case, not less than in others there are, beyond all doubt, fixed laws, and the varying results which we see are easily and sufficiently accounted for by the existence of conditions or modifying influences not fully patent to our observation.

In the year 1825, the Highland Society of Scotland, proposed as the subject of prize essays, the solution of the question, "whether the breed of live stock connected with agriculture be susceptible of the greatest improvement from the qualities conspicuous in the male or from those conspicuous in the female parent?" Four essays received premiums. Mr. Boswell, one of the prize writers, maintained that it is not only the male parent which is capable of most speedily improving the breed of live stock, "but that the male is the parent which we can alone look to for improvement."

His paper is of considerable length and ably written—abounding in argument and illustrations not easily condensed so as to be given here, and it is but justice to add that he also holds that "before the breed of a country can be improved, much more must be looked to than the answer to the question put by the Highland Society—such as crossing, selection of both parents, attention to pedigree, and to the food and care of offspring."

And of crossing, he says, "when I praise the advantage of crossing, I would have it clearly understood that it is only to bring together animals *not nearly related* but always of *the same breed;* never attempting to breed from a speed horse and a draught mare or vice versa." Crossing of breeds "may do well enough for once, but will end in vexation, if attempted to be prolonged into a line."

Mr. Christian, in his essay, supports the view, that the offspring

bears the greatest resemblance to that parent whether male or female, which has exerted the greatest sway of generative influence in the formation of the fœtus, "that any hypothesis which would assign a superiority, or set limits to the influence of either sex in the product of generation is unsound and inadmissible," and he thus concludes—"as therefore it is unsafe to trust to the qualities of any individual animal, male or female, in improving stock, the best bred and most perfect animals of both sexes should be selected and employed in propagation; there being, in short, no other certain or equally efficacious means of establishing or preserving an eligible breed."

Mr. Dallas, in his essay, starts with the idea that the seminal fluid of the male invests the ovum, the formation of which he ascribes to the female: and he supports the opinion, that where external appearance is concerned, the influence of the male will be discovered; but in what relates to internal qualities, the offspring will take most from the female. He concludes thus:—"When color, quality of fleece, or outward form is wanted, the male may be most depended on for these; but when milk is the object, when disposition, hardiness, and freedom from diseases of the viscera, and, in short, all internal qualities that may be desired, then the female may be most relied on."

One of the most valuable of these papers was written by the Rev. Henry Berry of Worcestershire, in which, after stating that the question proposed is one full of difficulty and that the discovery of an independent quality such as that alluded to, in either sex, would be attended with beneficial results, he proceeds to show, that it is not to sex, but to high blood or, in other words, to animals long and successfully selected, and bred with a view to particular qualifications, whether in the male or female parent, that the quality is to be ascribed, which the Highland Society has been desirous to assign correctly.

The origin of the prevalent opinion which assigns this power principally to the male, is explained by giving the probable history of the first efforts in improving stock. The greatest attention would naturally be paid to the male, both on account of his more extended services, and the more numerous produce of which he could become the parent: in consequence of which sires would be well-bred before dams. "The ideas entertained respecting the useful qualities of an animal would be very similar and lead to the adoption of a general standard of excellence, towards which it

would be required that each male should approximate; and thus there would exist among what may be termed fashionable sires, a corresponding form and character different from, and superior to, those of the general stock of the country. This form and character would in most instances have been acquired by *perseverance in breeding from animals which possessed the important or fancied requisites*, and might therefore be said to be almost *confirmed* in such individuals. Under these circumstances, striking results would doubtless follow the introduction of these sires to a common stock; results which would lead superficial observers to remark, that individual sires possessed properties as *males*, which in fact were only assignable to them as *improved* animals."

The opinion entertained by some, that the female possesses the power generally ascribed to the male, he explains also by a reference to the history of breeding:—"It is well known to persons conversant with the subject of improved breeding, that of late years numerous sales have taken place of the entire stocks of celebrated breeders of sires, and thus, the females, valuable for such a purpose, have passed into a great number of hands. Such persons have sometimes introduced a cow so acquired to a bull inferior in point of descent and general good qualities, and the offspring is known, in many instances, to have proved superior to the sire by virtue of the dam's excellence, and to have caused a suspicion in the minds of persons not habituated to compare causes with effects, that certain females also possess the property in question."

The writer gives various instances illustrative of his views, in some of which the male only, and in others the female only, was the high-bred animal, in all of which the progeny bore a remarkable resemblance to the well-bred parent. He says, that where both parents are equally well bred, and of nearly equal individual excellence, it is not probable that their progeny will give general proof of a preponderating power in either parent to impress peculiar characteristics upon the offspring;—yet in view of all the information we have upon the subject, he recommends a resort to the best males as the most simple and efficacious mode of improving such stocks as require improvement, and the only proceeding by which stock already good can be preserved in excellence.

Mon. Giron* expresses the opinion that the relative age and vigor of the parents exercises very considerable influence, and

*In his work, "De la Generation," Paris, 1828.)

states as the results of his observation, that the offspring of an old male and a young female resembles the father less than the mother in proportion as the mother is more vigorous and the father more decrepit, and that the reverse occurs with the offspring of an old female and a young male.

Among the more recent theories or hypotheses which have been started regarding the relative influence of the male and female parents, those of Mr. Orton, presented in a paper read before the Farmers' Club at Newcastle upon Tyne, on the Physiology of Breeding, and of the late Mr. Walker in his work on Intermarriage, as they both arrived (so far, at least, as regards crossing different breeds) at substantially the same conclusions by independent observations of their own, and as these seem to agree most nearly with the majority of observed facts, are deemed worthy of favorable mention.

The conclusions of Mr. Orton, briefly stated,* are, that in the progeny there is no casual or haphazard blending of the parts or qualities of the two parents, but rather that organization is transmitted by halves, or that each parent contributes to the formation of certain structures, and to the development of certain qualities. Advancing a step further, he maintains, that the male parent chiefly determines the external characters, the general appearance, in fact, the outward structure and locomotive powers of the offspring, as the framework, or bones and muscles, more particularly those of the limbs, the organs of sense and skin; while the female parent chiefly determines the internal structures and the general quality, mainly furnishing the vital organs, i. e., the heart, lungs, glands and digestive organs, and giving tone and character to the vital functions of secretion, nutrition and growth. "Not however that the male is without influence on the internal organs and vital functions, or the female without influence on the external organs and locomotive powers of their offspring. The law holds only within certain restrictions, and these form as it were a secondary law, one of limitations, and scarcely less important to be understood than the fundamental law itself."

Mr. Orton relies chiefly on the evidence presented by *hybrids*, the progeny of distinct species, or by crosses between the most distinct varieties embraced within a single species, to establish his

*Quoted, in part, from a paper by Alex. Harvey, M. D., read before the Medical Society of Southampton, June 6th, 1854.

law. The examples adduced are chiefly from the former. The *mule* is the progeny of the male ass and the mare; the *hinny*, that of the horse and the she ass. Both hybrids are the produce of the same set of animals. They differ widely, however, in their respective characters—the mule in all that relates to its external characters having the distinctive features of the ass,—the hinny, in the same respects having all the distinctive features of the horse; while in all that relates to the internal organs and vital qualities, the mule partakes of the character of the horse, and the hinny of those of the ass. Mr. Orton says—"The mule, the produce of the male ass and mare, is essentially a *modified ass:* the ears are those of an ass somewhat shortened; the mane is that of the ass, erect; the tail is that of an ass; the skin and color are those of an ass somewhat modified; the legs are slender and the hoofs high, narrow and contracted, like those of an ass. In fact, in all these respects it is an ass somewhat modified. The body and barrel (however) of the mule are round and full, in which it differs from the ass and resembles the mare.

The hinny, on the other hand, the produce of the stallion and she ass, is essentially a *modified horse.* The ears are those of a horse somewhat lengthened; the mane flowing; the tail bushy, like that of the horse; the skin is finer, like that of the horse, and the color varies also, like the horse; the legs are stronger and the hoofs broad and expanded like those of the horse. In fact, in all these respects it is a horse somewhat modified. The body and barrel (however) of the hinny are flat and narrow, in which it differs from the horse and resembles the she ass.

A very curious circumstance pertains to the voice of the mule and the hinny. The mule *brays*, the hinny *neighs.* The why and wherefore of this is a perfect mystery until we come to apply the knowledge afforded us by the law before given. The male gives the locomotive organs, and the muscles are amongst these; the muscles are the organs which modulate the voice of the animal; the mule has the muscular structure of its sire, and brays; the hinny has the muscular structure of its sire, and neighs."

In connexion with these examples Mr. Orton refers to a special feature seen equally in the two instances, and which seems at first sight, a departure from the principle laid down by him. It is this, both hybrids, the mule and the hinny take after the male parents in all their external characters save one, which is *size.* In this

respect they both follow the female parents, the mule being in all respects a larger and finer animal than its sire, the ass; the hinny being in all respects a smaller and inferior animal to its sire, the horse, the body and barrel of the mule being large and round, those of the hinny being flat and narrow: both animals being in these particulars the reverse of their respective sires, but both resembling their female parents.

In explanation of this seeming exception is adduced a well known principle in physiology, which is, that the whole bony framework is moulded in adaptation to the softer structures immediately related to it: the muscles covering it in the case of the limbs: and to the viscera in that of the great cavities which it assists in forming. Accordingly, in perfect accordance with the views above expressed, the *general* size and form which must be mainly that of the *trunk*, will be determined by the size and character of the viscera of the chest and abdomen, and will therefore accord with that of the female parents by whom the viscera in question are chiefly furnished.

The foregoing are the most important of Mr. Orton's statements. He gives, however, numerous additional illustrations from among beasts, birds and fishes, of which we quote only the following:

"The mule and the hinny have been selected and placed first, because they afford the most conclusive evidence and are the most familiar. Equally conclusive, though perhaps less striking instances, may be drawn from other sources. Thus, it has been observed that when the Ancon or Otter sheep were allowed to breed with common ewes, the cross is not a medium between the two breeds, but that the offspring retains in a great measure the short and twisted legs of the sire.

Buffon made a cross between the male goat and the ewe: the resulting hybrid in all the instances, which were many, were strongly characteristic of the male parent, more particularly in the hair and length of leg. Curious enough, the number of teats in some of the cases corresponded with those of the goat.

A cross between the male wolf and a bitch illustrates the same law: the offspring having a markedly wolfish aspect: skin, color, ears and tail. On the other hand, a cross between the dog and female wolf afforded animals much more dog-like in aspect—slouched ears and even pied in color. If you look at the descriptions and illustrations of these two hybrids, you will perceive at a

glance that the doubt arises to the mind in the case of the first, 'what genus of *wolf* is this?' whereas in the case of the second, 'what a curious *mongrel dog!*'

The views of the late Mr. Walker in his work on Intermarriage, before alluded to, agree substantially with those of Mr. Orton, *so far as regards crossing between different breeds;* but they cover a broader field of observation and in some respects differ. Mr. Walker maintains that when both parents are of the *same breed* that *either parent may transmit either half* of the organization. That when they are of *different varieties* or breeds (and by parity of reasoning the same should hold, strongly, when hybrids are produced by crossing different species) and supposing also that both parents are of equal age and vigor, that the *male* gives the *back head and locomotive organs* and the *female* the *face and* nutritive organs—I quote his language: 'when both parents are of the same variety, *one parent communicates the anterior part of the head, the bony part of the face, the forms of the organs of sense* (the external ear, under lip, lower part of the nose and eye brows being often modified) *and the whole of the internal nutritive system,* (the contents of the trunk or the thoracic and abdominal viscera, and consequently the form of the trunk itself in so far as that depends on its contents.)

The resemblance to that parent is consequently found in the forehead and bony parts of the face, as the orbits, cheek bones, jaws, chin and teeth, as well as the shape of the organs of sense and the tone of the voice.

The other parent communicates the posterior part of the head, the cerebel situated within the skull immediately above its junction with the back of the neck, and the whole of the locomotive system; (the bones, ligaments and muscles or fleshy parts.)

The resemblance to that parent is consequently found in the back head, the few more movable parts of the face, as the external ear, under lip, lower part of the nose, eyebrows, and the external forms of the body, in so far as they depend on the muscles as well as the form of the limbs, even to the fingers, toes and nails. * *

It is a fact established by my observations that in animals of the *same variety, either the male or the female parent* may give *either series of organs* as above arranged—that is *either* forehead and organs of sense, together with the vital and nutritive organs, *or* back head, together with the locomotive organs."

To show that among domesticated animals organization is transmitted by halves in the way indicated, and that either parent may

give either series of organs, he cites among other instances the account of the Ancon sheep. "When both parents are of the Ancon or Otter breed, their descendants inherit their peculiar appearance and proportions of form. When an Ancon ewe is impregnated by a common ram, the progeny resembles wholly either the ewe or the ram. The progeny of a common ewe impregnated by an Ancon ram follows entirely in shape the one or the other without blending any of the distinguishing and essential peculiarities of both.

'Frequent instances have occurred where common ewes have had twins by Ancon rams; when one exhibited the complete marks and features of the ewe and the other of the ram. The contrast has been rendered singularly striking when one short legged and one long legged lamb produced at a birth have been sucking the dam at the same time.'

As the short and crooked legs or those of opposite form, here indicate the parent giving the locomotive system, it is evident that one of the twins derived it from one parent and the other twin from the other parent;—the parent not giving it, doubtless communicating in each case, the vital or nutritive system."

Where the parents are of different varieties or species, Mr. Walker says, "The second law, namely, that of CROSSING, operates where each parent is of a *different breed*, and where, supposing both to be of equal age and vigor, the *male* gives the *backhead* and *locomotive organs*, and the *female* the *face* and *nutritive organs*."

After giving numerous illustrations from facts and many quotations from eminent breeders, he says, "thus, in crosses of cattle as well as of horses, the male, except where feebler or of inferior voluntary and locomotive power, gives the locomotive system, the female the vital one."

W. C. Spooner, V. S., one of the most eminent authorities of the present day on this subject, and writing within the past year in the Journal of the Royal Agricultural Society, says:—"The most probable supposition is, that propagation is done by halves, each parent giving to the offspring the shape of one half of the body. Thus the back, loins, hind-quarters, general shape, skin and size follow one parent; and the fore-quarters, head, vital and nervous system, the other; and we may go so far as to add, that the former in the great majority of cases go with the male parent, and the latter with the female. A corroboration of this fact is found in the common system of putting an ordinary mare to a thorough-bred

horse; not only does the head of the offspring resemble the dam but the forelegs likewise, and thus it is fortunately the case that the too-frequently faulty and tottering legs of the sire are not reproduced in the foal, whilst the full thighs and hind quarters which belong to the blood-horse are generally given to the offspring. There is however a minority of cases in which the opposite result obtains. That size is governed more by the male parent there is no great difficulty in showing; familiar examples may be found in the pony-mare and the full sized horse, which considerably exceed the dam in size. Again, in the first cross between the small indigenous ewe and the large ram of another improved breed—the offspring is found to approach in size and shape very much to the ram. The mule offspring of the mare also much resembles both in size and appearance its donkey sire. These are familiar examples of the preponderating influence of the male parent, so far as the external form is considered. To show however that size and hight do not invariably follow the male, we need go no further for illustration than the human subject. How often do we find that in the by no means unfrequent case of the union of a tall man with a short woman, the result in some instances is that all the children are tall and in others all short; or sometimes that some are short and others tall. Within our own knowledge in one case, where the father was tall and the mother short, the children, six in number, are all tall. In another instance, the father being short and the mother tall, the children, seven in number, are all of lofty stature. In a third instance, the mother being tall and the father short, the greater portion of the family are short. Such facts as these are sufficient to prove that hight or growth does not exclusively follow either the one parent or the other. Although this is the case, it is also a striking fact that the union of tall and short parents rarely, if ever, produces offspring of a medium size—midway, as it were, between the two parents.

Thus, in the breeding of animals, if the object be to modify certain defects by using a male or female in which such defects may not exist, we cannot produce this desired alteration; or rather it cannot be equally produced in all the offspring, but can only be attained by weeding out those in whom the objectionable points are repeated. We are, however, of opinion that in the majority of instances, the hight in the human subject, and the size and *contour* in animals, is influenced *much more by the male* than the female

parent—and on the other hand, that the constitution, the chest and vital organs, and the forehand generally more frequently follow the female."

Dr. Carpenter, the highest authority in Physiology, says "it has long been a prevalent idea that certain parts of the organism of the offspring are derived from the male, and certain other parts from the female parent; and although no universal rule can be laid down upon this point, yet the independent observations which have been made by numerous practical breeders of domestic animals seem to establish that such a *tendency* has a real existence; the characters of the *animal* portion of the fabric being especially (but not exclusively) derived from the male parent, and those of the *organic* apparatus being in like manner derived from the female parent. The former will be chiefly manifested in the external appearance, in the general configuration of the head and limbs, in the organs of the senses (including the skin) and in the locomotive apparatus; whilst the latter show themselves in the size of the body (which is primarily determined by the development of the viscera contained in the trunk) and in the mode in which the vital functions are performed."

On the whole it may be said that the evidence both from observation and the testimony of the best practical breeders goes to show that each parent usually contributes certain portions of the organization to the offspring, and that each has a modifying influence upon the other. Facts also show that the same parent does not always contribute the same portions, but that the order is reversed. Now, as no operation of nature is by accident, but by virtue of *law*, there must be fixed laws here, and there must also be, at times, certain influences at work to modify the action of these laws. Where animals are of distinct species, or of distinct breeds, transmission is usually found to be in accordance with the rule above indicated, i. e. the male gives mostly the outward form and locomotive system, and the female chiefly the interior system, constitution, &c. Where the parents are of the same breed, it appears that the portions contributed by each are governed in large measure by the condition of each in regard to age and vigor, or by virtue of individual potency or superiority of physical endowment.

This *potency* or power of transmission seems to be legitimately connected with high breeding, or the concentration of fixed qualities obtained by continued descent for many generations from such only

as possess in the highest degree the qualities desired. On the other hand it must be admitted that there are exceptional cases not easily accounted for upon any theory, and it seems not improbable that in these the modifying influences may be such as to effect what may approximate a reconstruction or new combination of the elements, in a manner analogous to the chemical changes which we know take place in the constituents of vegetables, as for instance, we find that sugar, gum and starch, substances quite unlike in their appearance and uses, are yet formed from the same elements and in nearly or precisely the same proportions, by a chemistry which we have not yet fathomed. Whether this supposition be correct or not, there is little doubt that if we understood fully all influences at work, and could estimate fairly all the data to judge from, we might predict with confidence what would be the characteristics of the progeny from any given union.

Practically, the knowledge obtained dictates in a most emphatic manner that every stock-grower use his utmost endeavor to obtain the services of the best sires; that is, *the best for the end and purposes in view*—that he depend chiefly on the sire for outward form and symmetry—that he select dams best calculated to develop the good qualities of the male, depending chiefly upon these for freedom from internal disease, for hardihood, constitution, and generally for all qualities dependent upon the vital or nutritive system.

The neglect which is too common, and especially in breeding horses, to the qualities of the dam, miserably old and inferior females being often employed, cannot be too strongly censured. In rearing valuable horses the dams are not of less consequence than the sires, although their influence upon the progeny be not the same. This is well understood and practiced upon by the Arab, who cultivates endurance and bottom. If his mare be of the true Kochlani breed he will part with her for no consideration whatever, while you can buy his stallion at a comparatively moderate price. The prevalent practice in England and America of cultivating speed in preference to other qualities, has led us to attach greater importance to the male, and the too common neglect of health, vigor, endurance and constitution in the mares has in thousands of cases entailed the loss of qualities not less valuable, and without which speed alone is of comparatively little worth.

Sex.—With regard to the laws which regulate the sex of progeny very little is known. Many and extensive observations have been

made but without arriving at any definite conclusions. Nature seems to have provided that the number of either sex produced, shall be nearly equal, but by what means this result is attained, has not been discovered. Some physiologists think the sex decided by the influence of the sire, others think it due to the mother. Sir Everard Home believed the *ovum* or germ, previous to impregnation to be of no sex, but so formed as to be equally fitted to become either male or female, and that it is the process of impregnation which marks the sex and forms the generative organs; that before the fourth month the sex cannot be said to be confirmed, and that it will prove male or female as the tendency to the paternal or maternal type may preponderate.

Mr. T. A. Knight* was of opinion that the sex of progeny depended upon the influence of the female parent. He says, "The female parent's influence upon the sex of offspring in cows, and I have reason to believe in the females of our other domestic animals, is so strong, that it may, I think, be pronounced nearly positive." He also says, "I have repeatedly proved that by dividing a herd of thirty cows into three equal parts, I could calculate with confidence upon a large majority of females from one part, of males from another, and upon nearly an equal number of males and females from the remainder. I have frequently endeavored to change the habits by changing the male without success." He relates a case as follows—"Two cows brought all female offspring, one fourteen in fifteen years, and the other fifteen in sixteen years, though I annually changed the bull. Both however produced one male each, and that in the same year; and I confidently expected, when the one produced a male that the other would, as she did."

M. Giron, after long continued observation and experiment, stated with much confidence, that the general law upon this point was that the sex of progeny would depend on the greater or less relative vigor of the individuals coupled. In many experiments purposely made, he obtained from ewes more males than females by coupling very strong rams with ewes either too young, or too aged, or badly fed, and more females than males by a reverse choice in the ewes and rams he put together.

Mon. Martegoute, formerly Professor of Rural Economy, in a late communication to the "Journal D'Agriculture Pratique," says

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*Philosophical Transactions, 1809.

that as the result of daily observations at a sheepfold of great importance, that of the Dishley Mauchamp Merinos of M. Viallet at Blanc, he has, if not deceived, obtained some new hints. He states that Giron's law developed itself regularly at the sheepfold in all cases where difference of vigor was observed in the ewes or rams which were coupled; but he adds another fact, which he had observed every year since 1853, when his observations began. This fact consists—1st, In that at the commencement of the rutting season when the ram is in his full vigor he procreated more males than females. 2d, When, some days after, and the ewes coming in heat in great numbers at once, the ram being weakened by a more frequent renewal of the exertion, the procreation of females took the lead." 3d, The period of excessive exertion having passed, and the number of ewes in heat being diminished, the ram also found less weakened, the procreation of males in majority again commenced.

In order to show that the cause of such a result is isolated from all other influences of a nature to be confounded with it, he gives the details of his observations in a year when the number of births of males and females were about equal. He also goes on to say, that, "at the end of each month all the animals at the sheepfold are weighed separately, and thanks to these monthly weighings, we have drawn up several tables from which are seen the diminution or increase in weight of the different animals classed in various points of view, whether according to age, sex or the object for which they were intended.

Two of these tables have been appropriated to bearing ewes—one to those which have borne and nursed males and the other to those which have borne and brought up females. The abstract results of these two tables have furnished two remarkable facts. 1st, The ewes that have produced the female lambs are, on an average, of a weight superior to those that produced the males; and they evidently lose more in weight than these last during the suckling period. 2d, The ewes that produce males weigh less, and do not lose in nursing so much as the others.

If the indications given by these facts come to be confirmed by experiments sufficiently repeated, two new laws will be placed by the side of that which Giron de Bazareingues has determined by his observations and experiments. On the one hand, as, at liberty, or in the savage state, it is a general rule that the predominance in

acts of generation belongs to the strongest males to the exclusion of the weak, and as such a predominance is favorable to the procreation of the male sex, it would follow that the number of males would tend to suppass incessantly that of the females, amongst whom no want of energy or power would turn aside from generation, and the species would find in it a fatal obstacle to its reproduction. But, on the other hand, if it was true that the strongest females and the best nurses amongst them produce females rather than males, nature would thus oppose a contrary law, which would establish the equilibrium, and by an admirable harmony would secure the perfection and preservation of the species, by confiding the reproduction of either sex to the most perfect type of each respectively."

In-and-in Breeding.—It has long been a disputed point whether the system of breeding *in-and-in* or the opposite one of frequent crossing has the greater tendency to maintain or improve the character of stock. The advocates of both systems are earnest and confident of being in the right. The truth probably is, as in some other similar disputes, that both are right and both wrong—to a certain extent, or within certain limits.

The term *in-and-in* is often very loosely used and is variously understood; some, and among these several of the best writers, confine the phrase to the coupling of those of exactly the same blood, i. e. brothers and sisters; while others include in it breeding from parents and offspring, and others still employ the term to embrace those of more distant relationship. For the latter, the term breeding in, or close breeding, is deemed more fitting.

The prevalent opinion is decidedly against the practice of breeding from any near relationships; it being usually found that degeneracy follows, and often to a serious degree; but it is not proved that this degeneracy, although very common and even usual, is yet a necessary consequence. That ill effects follow in a majority of cases is not to be doubted, but this is easily and sufficiently accounted for upon other grounds. In a state of nature animals of near affinities interbreed without injurious results, and it is found by experience that where domesticated animals are of a pure race, or of a distinct, well defined and pure breed, the coupling of those of near affinities is not so often followed by injurious effects as when they are crosses, or of mixed or mongrel origin, like the great majority of the cattle in the country at large. In

the latter case breeding in-and-in is *usually* found to result in decided and rapid deterioration.

We should consider also that few animals in a state of domestication are wholly free from hereditary defects and diseases, and that these are propagated all the more readily and surely when possessed by both parents, and that those nearly related are more likely than others, to possess similar qualities and tendencies.

If such is to be regarded as the true explanation, it follows that the same method would be also efficacious in perpetuating and confirming good qualities. Such is the fact; and it is well known that nearly all who have achieved eminence as breeders, have availed themselves freely of its benefits. Bakewell, the Messrs. Collings, Mr. Mason, Mr. Bates and others, all practiced it. Mr. Bates' rule was, "breed in-and-in from a bad stock and you cause ruin and devastation, they must always be changing to keep even moderately in caste; but *if a good stock* be selected, you may breed in-and-in as much as you please."* Bakewell originated his famous sheep by crossing from the best he could gather from far or near; but when he had obtained such as suited him, he bred exclusively from within his own. As in all breeding from crosses, it was needful to throw out as weeds, a large proportion of the progeny, but by rigidly doing so, and saving none to breed from but such as became more and more firmly possessed of the forms and qualities desired, the weeds gradually became fewer, until at length he fully established the breed; and he continued it, and sustained its high reputation during his life by in-breeding *connected with proper selections for coupling.* After his death, others, not possessing his tact and judgment in making selections, were less fortunate, and in some hands the breed degenerated seriously, insomuch that it was humorously remarked, "there was nothing but a little tallow left." In others it has been maintained by the same method. Mr. Valentine Barford of Foscote, has the pedigree of his Leicester sheep since the day of Bakewell, in 1783, and since 1810, he has bred entirely from his own flock, sire and dam, without an interchange of male or female from any other flock. He observes "that his flock being bred from the nearest affinities—commonly called in-and-in breeding—has not experienced any of the ill effects as-

*Mr. Bates, although eminent as a breeder, was not infallible in making his selections for coupling, and after long continued close breeding, he was himself compelled to go out of his own herd to procure a different strain of blood.

cribed to the practice." W. C. Spooner, V. S., speaking of Mr. Barford's sheep says, "His flock is remarkably healthy and his rams successful, but his sheep are small."

Mr. Charles Colling, after he procured the famous bull Hubback, selected cows most likely to develop his special excellencies, and from the progeny of these he bred very closely. From that day to this, the Short-horns as a general thing, have been very closely bred,* and the practice has been carried so far, the selections not always being the most judicious possible, as to result in delicacy of

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* Probably few who have not critically examined the facts regarding close breeding in the improved Short-horns are aware of the extent to which it has been and is still carried. On the 28th of March, 1850, at a sale of Short-horns at Milcote, near Stratford upon Avon (England) thirty-one descendants of a cow called "Charmer," bred of Mr. Colling's purest blood, and praised in the advertisement as "capital milkers and very prolific, *not having been pampered*," sold for £2,140, averaging about $350 each, and many of them were calves. The stock was also praised as "offering to the public as much of the pure blood of 'Favorite' as could be found in any herd." With reference to this sale, which also comprised other stock, the Agricultural Gazette, published a few days previous, had some remarks from which the following is extracted:

"It is unquestionable that the ability of a cow or bull to transmit the merit either may possess does in a great degree depend upon its having been inherited by them through a long line of ancestry. Nothing is more remarkable than the way in which the earlier improvers of the Short-horn breed carried out their belief in this. They were indeed driven by the comparative fewness of well bred animals to a repeated use of the same sire on successive generations of his own begetting, while breeders now-a-days have the advantage of fifty different strains and families from which to choose the materials of their herd, but whether it were necessity or choice it is certain that the pedigree of no pure bred Short-horn can be traced without very soon reaching many an illustration of the way in which 'breeding in-and-in' has influenced its character, deepened it, made it permanent, so that it is handed down unimpaired and even strengthened in the hands of the judicious breeder. What an extraordinary influence has thus been exerted by a single bull on the fortunes of the Short-horn breed! There is hardly a single choice pure-bred Short-horn that is not descended from 'Favorite' (252) and not only descended in a single line—but descended in fifty different lines. Take any single animal, and this bull shall occur in a dozen of its preceding generations and repeatedly up to a hundred times! in the animals of some of the more distant generations. His influence is thus so paramount in the breed that one fancies he has created it and that the present character of the whole breed is due the 'accidental' appearance of an animal of extraordinary endowments on the stage in the beginning of the present century. And yet this is not so;—he is himself an illustration of the breeding in-and-in system—his sire and dam having been half brother and sister, both got by 'Foljambe.' And this breeding in-and-in has handed down his influence to the present time in an extraordinary degree. Take for instance, the cow 'Charmer,' from which as will be seen elsewhere, no fewer than thirty-one descendants are to be sold next Wednesday. She had of course two immediate parents, four progenitors in

constitution, and in some cases where connected with pampering, in sterility.†

Col. Jaques, of the Ten Hills Farm near Boston, imported a pair of Bremen geese in 1822. They were bred together till 1830, when the gander was accidentally killed. Since then the goose bred with her offspring till she was killed by an attack of dogs in 1852. Great numbers were bred during this time, and of course there was much of the closest breeding, yet there was no deterioration, and in fact some of the later ones were larger and better than the first pair.

The same gentleman also obtained a pair of wild geese from Canada in 1818, which with their progeny were bred from without change until destroyed by dogs with the above named in 1852. They continued perfect as at first.

Among gregarious ruminating animals in a state of nature, all who associate in a herd acknowledge a chieftain, or head, who maintains his position by virtue of physical health, strength and general superiority. He not only directs all their movements but is literally the father of the herd. When a stronger than he comes, the post of chieftain and sire is yielded, but in all probability his successor is one of his own sons, who in turn begets offspring by his

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the second generation, eight in the third, sixteen in the fourth, the number necessarily doubling each step farther back. Of the eight bulls named in the fourth generation from which she was descended, one was by 'Favorite.' She is one-sixteenth 'Favorite' on that account, but the cow to which he was then put was also descended from 'Favorite,' and so are each of the other seven bulls and seven cows which stand on the same level of descent with the gr. gr. g. dam of 'Charmer.' And in fact it will be found on examination that in so far as 'Charmer's' pedigree is known, which it is in some instances to the sixteenth generation, she is not one-sixteenth only but nearly nine-sixteenths of pure Favorite blood. This arises from 'Favorite' having been used repeatedly on cows descended from himself. In the pedigree of 'Charmer' we repeatedly meet with 'Comet'—'Comet' was by 'Favorite' and his dam 'Young Phœnix' was also by 'Favorite;' with 'George'—'George' was by 'Favorite' and his dam 'Lady Grace' was also by 'Favorite;' with 'Chilton'—'Chilton' was by 'Favorite' and his dam was also by 'Favorite;' with 'Minor'—'Minor' was by 'Favorite' and his dam also was by 'Favorite;' with 'Peeress'—she was by 'Favorite' and her dam also by 'Favorite;' with 'Bright Eyes'—she was by 'Favorite' and her dam also by 'Favorite;' with 'Strawberry'—she was by 'Favorite' and her dam by 'Favorite;' 'Dandy,' 'Moss Rose,' among the cows and 'North Star' among the bulls are also of similar descent.

There is no difficulty therefore in understanding how this name appears repeatedly in any given generation of the pedigree of any given animal of the Short-horn breed.''

† Journal Royal Agricultural Society, volume 20, page 297.

sisters. The progeny inheriting full health, strength and development, the herd continues in full power and vigor,* and does not degenerate as often happens when man assumes to make the selections, and chooses according to fancy or convenience. The continuance of health, strength and perfect physical development is believed to depend on the *wisdom of the selection, upon the presence of the desirable hereditary qualities, and the absence of injurious ones,* and not upon relationship whether near or remote.

It has fallen within the observation of most persons that in the human race frequent intermarriages in the same family for successive generations often tend to degeneracy of both mind and body; size and vigor diminishing, and constitutional defects and diseases being perpetuated and aggravated; but neither in this case is the result believed to be a necessary and inevitable consequence. Else how could it be, that Infinite Wisdom, whose operations are ever in accordance with the laws of his own institution, in originating a "peculiar people," chosen to be the depositories of intellectual and physical power, wealth and influence, and who, in spite of oppression without parallel in the world's history, have ever maintained the possession of a goodly share of all these,—would have allowed their first progenitor, Abraham, to marry his near kinswoman Sarah, a half sister, niece or cousin, and Isaac their son to wed his first cousin Rebecca, and Jacob who sprang from that union, to marry first cousins, and their offspring for long generations to intermarry within their own people and tribes alone?

At a later period, marriages within certain degrees of consanguinity were forbidden by Divine authority, but not until the peculiar race was fully established, and so far multiplied, as to allow departure from close breeding without change of characteristics, and not improbably the prohibition was even then based more upon moral reasons, or upon man's ignorance or recklessness regarding selection, than upon physical laws.

Such laws exist among us at present, and it is well they do, inasmuch as for the reasons already given there is greater probability of degeneracy by means of such connections than among those not so related by blood. But it is impossible for any legal enactments

* It may be said with truth, that the average health and vigor of a wild herd is much higher than it would be if the feebler portion of the young were reared, as in a state of domestication, instead of being destroyed by the stronger, or perishing from hardship; but if close breeding be, alone and necessarily, injurious, the whole herd should gradually fail, which is not found to be the case.

to prevent wholly the evil thus sought to be avoided. It would be better far, if such a degree of physiological knowledge existed and such caution was exercised among the community generally, as would prevent the contraction of any marriages, where, from the structure and endowments of the parties, debility, deformity, insanity or idiocy must inevitably be the portion of their offspring whether they be any more nearly related than through their common ancestor, Noah, or not.

If we adopt Mr. Walker's views, it is easy to see how parents of near affinities may produce offspring perfect and healthy, or the reverse. He holds that to secure satisfactory results from any union, there should be some inherent, constitutional, or fundamental difference; some such difference as we often see in the human family to be the ground of preference and attachment; as men generally prefer women of a feminine rather than a masculine type. All desire, in a mate, properties and qualities not possessed by themselves. Now assuming as Mr. Walker holds, that organization is transmitted by halves, and that, in animals of the same variety, either parent may give either series of organs, we can see in the case of brother and sister that if one receives the locomotive system of the father and the nutritive system of the mother, and the other the locomotive system of the mother and the nutritive system of the father, they are essentially unlike, there is scarcely any similarity between them, although, as we say, of precisely the same blood; and their progeny if coupled might show no deterioration; whereas, if both have the same series of organs from the same parents, they would be essentially the same, a sort of quasi identity would exist between them, and they are utterly unfit to be mated. There might be impotency, or barrenness, or the progeny, if any, would be decidedly inferior to the parents; and the same applies, more or less, to other relatives descended from a common ancestry, but more distant than brother and sister. Mr. Walker also holds that where the parents are not only of the same variety but of the same family in the narrowest sense, the female always gives the locomotive system and the father the nutritive; in which case the progeny is necessarily inferior to the parents.

A careful consideration of the subject brings us to the following conclusions, viz:

That in general practice, with the grades and mixed animals common in the country, *close breeding should be scrupulously avoided* as highly detrimental. It is better *always* to avoid breeding from

near affinities whenever stock-getters of the same breed and of equal merit can be obtained which are not related. Yet, where this is not possible, or where there is some desirable and clearly defined purpose in view, as the fixing and perpetuating of some valuable quality in a particular animal not common to the breed, and the breeder possesses the knowledge and skill needful to accomplish his purpose, and the animals are perfect in health and development, close breeding may be practiced with advantage.

Crossing.—The practice of crossing, like that of close breeding, has its strong and its weak side. Substantial arguments can be brought both in its favor and against it. Judiciously practiced, it offers a means of procuring animals *for the butcher*, often superior to and more profitable than those of any pure breed. It is also admissible as the foundation of a systematic and well considered attempt to establish a new breed. Such attempts, however, as they necessarily involve considerable expense, and efforts continued during a long term of years, will be rarely made. But when crossing is practiced injudiciously and indiscriminately, and especially when so done for the purpose of procuring *breeding animals*, it cannot be too severely censured, and is scarcely less objectionable than careless in-and-in breeding.

The following remarks, from the pen of W. C. Spooner, V. S., are commended as sound and reliable, and as comprising nearly all which need be said on the subject of crossing breeds possessing distinctive characteristics:

"Crossing is generally understood to refer to the alliance of animals of different breeds, such as between a thorough-bred and a half-bred amongst horses or a South Down and Leicester among sheep. Now the advantages or disadvantages of this system depend entirely on the object we have in view, whether merely to beget an animal for the butcher, or for the purpose of perpetuating the species. If the latter is the object, then crossing should be adopted gradually and with care, and by no means between distant or antagonistic qualities, as for example a thorough-bred and a cart-horse. The result of the latter connection is generally an ill-assorted and unfavorable animal, too heavy perhaps for one purpose, and too light for another. If we wish to instil more activity into the cart-horse breed, it is better to do so by means of some half-bred animal, whilst the latter can be improved by means of the three-parts-bred horse and this again by the thorough-bred. There is a remarkable tendency, in breeding, for both good qualities

and bad to disappear for one or two generations, and to reappear in the second and third; thus an animal often resembles the grand dam more than the dam. This peculiarity is itself an objection to the practice of crossing, as it tends to prevent uniformity and to encourage contrarieties; and thus we find in many flocks and herds that the hopes of the breeders have been entirely baffled and a race of mongrels established.

The first cross is generally successful—a tolerable degree of uniformity is produced, resembling in external conformation the sire, which is usually of a superior breed; and thus the offspring are superior to the dams. These cross-bred animals are now paired amongst each other, and what is the consequence? Uniformity at once disappears; some of the offspring resemble the grandsire, and others the grandams, and some possess the disposition and constitution of the one and some of the other; and consequently a race of mongrels is perpetuated. If, however, the cross is really a good and desirable one, then, by means of rigorous and continued selection, pursued for several generations, that is, by casting aside, as regards breeding purposes, every animal that does not exhibit uniformity or possess the qualifications we are desirous of perpetuating, a valuable breed of animals may in the course of time be established. By this system many varieties of sheep have been so far improved as to become almost new breeds; as for instance the New Oxfordshire which has frequently gained prizes at the great Agricultural Meetings as being the best long wooled sheep.

To cross, however, merely for crossing sake—to do so without that care and vigilance which we have deemed so essential—is a practice which cannot be too much condemned. It is in fact a national evil and a sin against society, that is, if carried beyond the first cross, or if the cross-bred animals are used for breeding. A useful breed of animals may thus be lost, and a generation of mongrels established in their place, a result which has followed in numerous instances amongst every breed of animals.

The principal use of crossing, however, is to raise animals for the butcher. In this respect it has not (with sheep) been adapted to the extent which it might to advantage. The male being generally an animal of a superior breed and of a vigorous nature, almost invariably stamps his external form, size and muscular development on the offspring, which thus bear a strong resemblance to him, whilst their internal nature derived from the dam,

well adapts them to the locality, as well as to the treatment to which their dams have been accustomed.

With regard to cattle, the system cannot be so advantageously pursued (except for the purpose of improving the size and qualities of the calf, where veal is the object) in as much as every required qualification for breeding purposes can be obtained by using animals of the pure breeds. But with sheep, where the peculiarities of the soil as regards the goodness of feed, and exposure to the severities of the weather, often prevent the introduction of an improved breed, the value of using a new and superior ram is often very considerable, and the weight of mutton is materially increased, without its quality being impaired, while earlier maturity is at the same time obtained. It involves, however, more systematic attention than farmers usually like to bestow, for it is necessary to employ a different ram for each purpose; that is, a native ram for a portion of the ewes to keep up the purity of the breed, and a foreign ram to raise the improved cross-bred animals for fatting either as lambs or sheep. This plan is adopted by many breeders of Leicester sheep, who thus employ South Down rams to improve the quality of the mutton. One inconvenience attending this plan, is the necessity of fatting the maiden ewes as well as the wethers; they may however be disposed of as fat lambs, or the practice of spaying might be adopted, so as to increase the fatting disposition of the animal. Crossing, therefore, should be adopted with the greatest caution and skill where the object is to improve breed of animals; it should never be practiced carelessly or capriciously, but it may be advantageously pursued with a view to raising superior and profitable animals for the butcher."

After presenting many interesting details regarding British breeds of sheep and the results of crossing, Mr. S. farther says:

"We cannot do better, in concluding our paper, than gather up and arrange in a collected form, the various points of our subject, which appear to be of sufficient importance to be again presented to the attention of our readers. We think, therefore, we are justified in coming to the conclusions:

1st. That there is a direct pecuniary advantage in judicious cross-breeding; that increased size, disposition to fatten, and early maturity, are thereby induced.

2d. That while this may be caused for the most part, by the very fact of crossing, yet it is principally due to the superior influence

of the male over the size and external appearance of the offspring; so that it is desirable, for the purpose of the butcher, that the male should be of a larger frame than the female, and should excel in those peculiarities we are desirous of reproducing. Let it be here, however, repeated, as an exceptional truth, that though as a rule the male parent influences mostly the size and external form, and the female parent the constitution, general health and vital powers, yet that the opposite result sometimes takes place.

3d. Certain peculiarities may be imparted to a breed by a single cross. Thus, the ponies of the New Forest exhibit characteristics of blood, although it is many years since that a thorough-bred horse was turned into the forest for the purpose. So, likewise, we observe in the Hampshire sheep the Roman nose and large heads, which formed so strong a feature in their maternal ancestors, although successive crosses of the South Down were employed to change the character of the breed. * * *

4th. Although in the crossing of sheep for the purpose of the butcher, it is generally advisable to use males of a larger breed, provided they possess a disposition to fatten; yet, in such cases, it is of importance that the *pelvis* of the female should be wide and capacious, so that no injury should arise in lambing, in consequence of the increased size of the heads of the lambs. The shape of the ram's head should be studied for the same reason. In crossing, however, for the purpose of establishing a new breed, the size of the male must give way to other more important considerations; although it will still be desirable to use a large female of the breed which we seek to improve. Thus the South Downs have vastly improved the larger Hampshires, and the Leicester the huge Lincolns and the Cotswolds.

5th. Although the benefits are most evident in the first cross, after which, from pairing the cross-bred animals, the defects of one breed or the other, or the incongruities of both, are perpetually breaking out—yet, unless the characteristics and conformation of the two breeds are altogether averse to each other, nature opposes no barrier to their successful admixture; so that in the course of time, by the aid of selection and careful weeding, it is practicable to establish a new breed altogether. This, in fact, has been the history of our principal breeds.

We confess that we cannot entirely admit either of the antagonistic doctrines held by the rival advocates of crossing and pure breeding. The public have reason to be grateful to the exertions

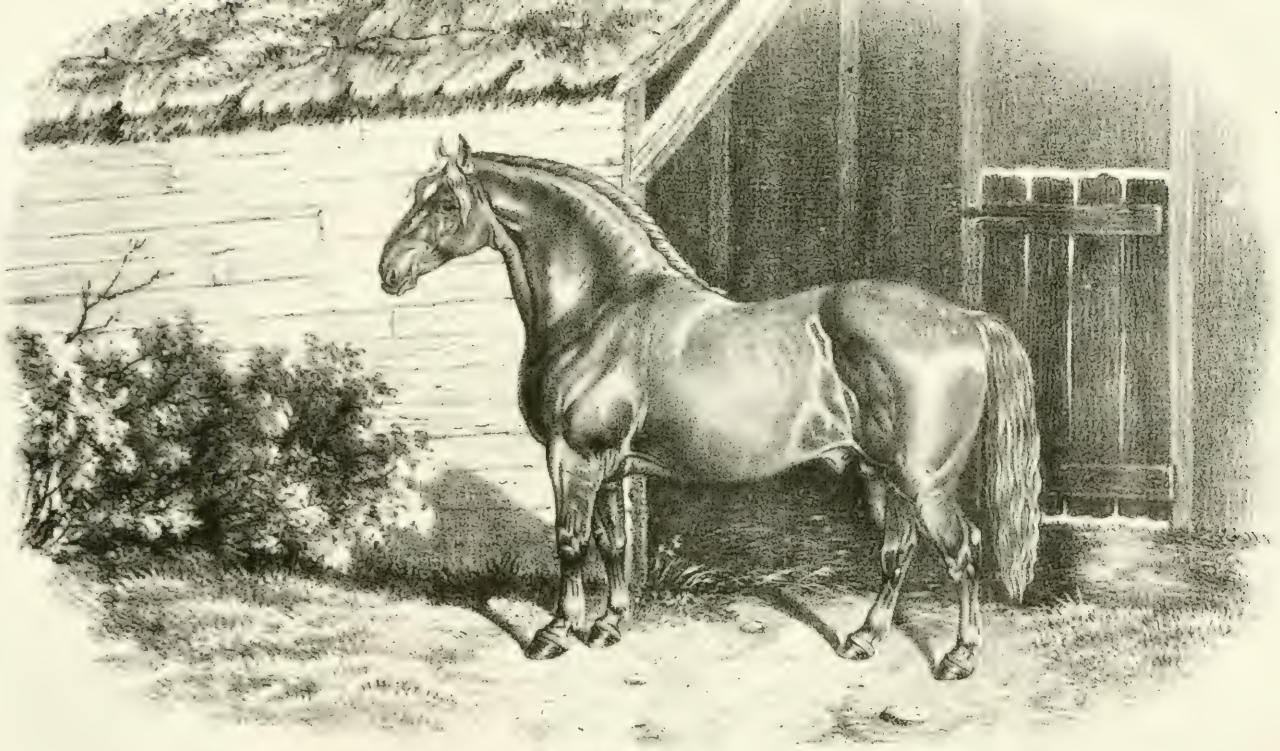
of either party; and still more have they respectively reason to be grateful to each other.

Let us conclude by repeating the advice that, when equal advantages can be attained by keeping a pure breed of sheep, such pure breed should unquestionably be preferred; and that, although crossing for the purpose of the butcher may be practiced with impunity, and even with advantage, yet no one should do so for the purpose of establishing a new breed, unless he has clear and well defined views of the object he seeks to accomplish, and has duly studied the principles on which it can be carried out, and is determined to bestow for the space of half a life-time his constant and unremitting attention to the discovery and removal of defects."

The term crossing is sometimes used in a much more restricted sense, as in the remark of Mr. Boswell in his essay quoted on page 89 where he says, "When I praise the advantage of crossing I would have it clearly understood that it is only to bring together animals *not nearly related* but always of *the same breed*." It is evident that such crossing as this is wholly unobjectionable: no one but an avowed and ultra advocate of close breeding would find any fault with it.

There is yet another style of crossing which when practicable, may, it is believed, be made a means to the highest degree of improvement attainable, and especially in the breeding of horses. The word "breed" is often used with varying signification. In order to be understood, let me premise that I use it here simply to designate a class of animals possessing a good degree of uniformity growing out of the fact of a common origin and of their having been reared under similar conditions. The method proposed is to unite animals *possessing similarity of desirable characteristics, with difference of breed*; that is to say, difference of breed in the sense just specified. From unions based upon this principle, the selections being guided by a skillful judgment and a discriminating tact, we may expect progeny possessing not only a fitting and symmetrical development of the locomotive system, but also an amount and intensity of nervous energy and power unattainable by any other method.

Such was in all probability the origin of the celebrated horse "Justin Morgan": an animal which not only did more to stamp excellence and impart value to the roadsters of New England than any other, but was the originator of the only distinct, indigenous breed of animals of which America can boast;—a breed which as fast and



THE EMPEROR.

A PRIZE SUFFOLK STALLION

(FOR GETTING DRAFT HORSES.)

durable road horses and for any light harness work, is not equalled by any other, any where. In the present state of our knowledge it is scarcely conceivable how an animal possessing the endowments of Justin Morgan could have originated in any other way than from such a parentage as above indicated. On the other hand it is very certain that *contrast in character*, as well as in breed, has occasioned much of the disappointment of which breeders have had occasion to complain.

The principle here laid down is one of broad application, and should never be lost sight of in attempts at improvement by crossing. Another point worthy special attention is that all crossing to insure successful results should be gentle rather than violent; that is, never couple animals possessing marked dissimilarity, but endeavor to remedy faults and to effect improvement by gradual approaches. Harmony of structure and a proper balancing of desirable characteristics, "an equilibrium of good qualities," as it has been happily expressed, can be secured only in this way.

It may not be out of place here to say, that much of the talk about *blood* in animals, especially horses, is sheer nonsense. When a "blood horse" is spoken of, it means, so far as it means any thing, that his pedigree can be traced to Arabian or Barbary origin, and so is possessed of the peculiar type of structure and great nervous energy which usually attaches to "thorough-bred" horses. When a bull, or cow, or sheep is said to be of "pure blood," it means simply that the animal is of some distinct variety—that it has been bred from an ancestry all of which were marked by the same peculiarities and characteristics.

So long as the term "blood" is used to convey the idea of definite hereditary qualities it may not be objectionable. We frequently use expressions which are not strictly accurate, as when we speak of the sun's rising and setting, and so long as every body knows that we refer to apparent position and not to any motion of the sun, no false ideas are conveyed. But to suppose that the hereditary qualities of an animal attach to the blood any more than to any other fluid or to any of the tissues of the body, or that the blood of a high-bred horse is essentially different from that of another, is entirely erroneous. The qualities of an animal depend upon its organization and endowments, and the blood is only the vehicle by which these are nourished and sustained;—moreover the blood varies in quality, composition and amount, according to the food eaten, the air breathed and the exercise taken. If one

horse is better than another it is not because the fluid in his veins is of superior quality, but rather because his structure is more perfect mechanically, and because nervous energy is present in fitting amount and intensity.

For illustration, take two horses—one so built and endowed that he can draw two tons or more three miles in an hour; the other so that he can trot a mile in three minutes or less. Let us suppose the blood coursing in the veins of each to be transferred to the other; would the draft horse acquire speed thereby, or the trotter acquire power? Just as much and no more as if you fed each for a month with the hay, oats and water intended for the other.

It is well to attend to pedigree, for thus only can we know what are the hereditary qualities, but it is not well to lay too much stress upon "blood." What matters it that my horse was sired by such a one or such a one, if he be himself defective? In breeding horses, *structure* is first, and endowment with nervous energy is next to be seen to, and then pedigree—afterwards that these be fittingly united, by proper selection for coupling, in order to secure the highest degree of probability which the nature of the case admits, that the offspring may prove a perfect machine and be suitably endowed with motive power.

"The body of an animal is a piece of mechanism, the moving power of which is the vital principle, which like fire to the steam engine sets the whole in motion; but whatever quantity of fire or vital energy may be applied, neither the animal machine nor the engine will work with regularity and effect, unless the individual parts of which the machine is composed are properly adjusted and fitted for the purposes for which they are intended: or if it is found that the machine does move by the increase of moving power, still the motion is irregular and imperfect; the bolts and joints are continually giving way, there is a continued straining of the various parts, and the machine becomes worn out and useless in half the time it might have lasted if the proportions had been just and accurate. Such is the case with the animal machine. It is not enough that it is put in motion by the noblest spirit or that is nourished by the highest blood; every bone must have its just proportion; every muscle or tendon its proper pulley; every lever its proper length and fulcrum; every joint its most accurate adjustment and proper lubrication; all must have their relative proportions and strength, before the motions of the machine can be accurate, vigorous and durable. In every machine modifications are required

according as the purposes vary to which it is applied. The heavy dray horse is far from having the arrangement necessary for the purposes of the turf, while the thorough-bred is as ill adapted for the dray. Animals are therefore to be selected for the individual purposes for which they are intended, with the modifications of form proper for the different uses to which they are to be applied; but for whatever purpose they may be intended, there are some points which are common to all, in the adjustment of the individual parts. If the bones want their due proportions, or are imperfectly placed—if the muscles or tendons want their proper levers—if the flexions of the joints be interrupted by the defectiveness of their mechanism, the animal must either be defective in motion or strength; the bones have irregular pressure, and if they do not break, become diseased; if the muscles or tendons do not become sprained or ruptured, they are defective in their action; if friction or inflammation does not take place in the joints, the motions are awkward and grotesque. As in every other machine, the beauty of the animate, whether in motion or at rest, depends upon the arrangement of the individual parts."

Breeding in the Line.—The preferable style of breeding for the great majority of farmers to adopt, is neither to cross, nor to breed from close affinities, (except in rare instances and for some specific and clearly understood purpose,) but to *breed in the line*, that is, select the breed or race best adapted to fulfill the requirements demanded, whether it be for the dairy, for labor or for beef in cattle, or for such combination of these as can be had without too great sacrifice of the principal requisite; whether for fine wool as a primary object and for meat as a secondary one, or for mutton as a primary and wool for a secondary object, and then procure a *pure bred* male of the kind determined on, and breed him to the females of the herd or of the flock; and if these be not such as are calculated to develop his qualities, endeavor by purchase or exchange to procure such as will. Let the progeny of these be bred to another *pure bred* male of the same breed, but as distantly related to the first as may be. Let this plan be steadily pursued, and although we cannot without the intervention of well bred females obtain stock purely of kind desired, yet in several generations, if proper care be given in the selection of males, that each one be such as to retain and improve upon the points gained by his predecessor, the stock for most practical purposes will be as good as if thoroughbred. Were this plan generally adopted, and a system of letting

or exchange of males established, the cost might be brought within the means of most persons, and the advantages gained to the State at large would be almost beyond belief. The writer on Cattle in the Library of Useful Knowledge well remarks:

"At the outset of his career, the farmer should have a clear and determined conception of the object that he wishes to accomplish. He should consider the nature of his farm; the quality, abundance or deficiency of his pasturage, the character of the soil, the seasons of the year when he will have plenty or deficiency of food, the locality of his farm, the market to which he has access and the produce which can be disposed of with greatest profit, and these things will at once point to him the breed he should be solicitous to obtain. The man of wealth and patriotism may have more extensive views, and nobly look to the general improvement of cattle; but the farmer, with his limited means and with the claims that press upon him, regards his cattle as a valuable portion of his own little property, and on which every thing should appear to be in natural keeping, and be turned to the best advantage. The best beast for him is that which suits his farm the best, and with a view to this, he studies, or ought to study, the points and qualities of his own cattle, and those of others. The dairyman will regard the quantity of milk—the quality—its value for the production of butter and cheese—the time that the cow continues in milk—the character of the breed for quietness, or as being good nurses—the predisposition to garget or other disease, or dropping after calving—the natural tendency to turn every thing to nutriment—the ease with which she is fattened when given up as a milker, and the proportion of food requisite to keep her in full milk or to fatten her when dry. The grazier will consider the kind of beast which his land will bear—the kind of meat most in demand in his neighborhood—the early maturity—the quickness of fattening at any age—the quality of the meat—the parts on which the flesh and fat are principally laid—and more than all the hardihood and the adaptation to the climate and soil.

In order to obtain these valuable properties the good farmer will make himself perfectly master of the characters and qualities of his own stock. He will trace the connection of certain good qualities and certain bad ones, with an almost invariable peculiarity of shape and structure; and at length he will arrive at a clear conception, not so much of beauty of form (although that is a pleasing object to contemplate) as of that outline and proportion of parts with

which *utility* is oftenest combined. Then carefully viewing his stock he will consider where they approach to, and how far they wander from, this utility of form; and he will be anxious to preserve or to increase the one and to supply the deficiency of the other. He will endeavor to select from his own stock those animals that excel in the most valuable points, and particularly those which possess the greatest number of these points, and he will unhesitatingly condemn every beast that manifests deficiency in any one important point. He will not, however, too long confine himself to his own stock, unless it be a very numerous one. The breeding from close affinities has many advantages to a certain extent. It was the source whence sprung the cattle and sheep of Bakewell and the superior cattle of Colling; and to it must also be traced the speedy degeneracy, the absolute disappearance of the New Leicester cattle, and, in the hands of many agriculturists, the impairment of constitution and decreased value of the New Leicester sheep and of the Short-horns. He will therefore seek some change in his stock every second or third year, and that change is most conveniently effected by introducing a new bull. This bull should be of the same breed, and pure, coming from a similar pasturage and climate, but possessing no relationship—or, at most, a very distant one—to the stock to which he is introduced. He should bring with him every good point which the breeder has labored to produce in his stock, and if possible, some improvement, and especially in the points where the old stock may have been somewhat deficient, and most certainly he should have no manifest defect of form; and that most essential of all qualifications, a hardy constitution, should not be wanting.

There is one circumstance, however, which the breeder occasionally forgets, but which is of as much importance to the permanent value of his stock as any careful selection of animals can be—and that is, good keeping. It has been well said that 'all good stock must be both bred with attention and well fed. It is necessary that these two essentials in this species of improvement should always accompany each other; for without good resources of keeping, it would be vain to attempt supporting a valuable stock.' This is true with regard to the original stock. It is yet more evident when animals are absurdly brought from a better to a poorer soil. The original stock will deteriorate if neglected and half-starved, and the improved breed will lose ground even more rapidly, and to a far greater extent."

A very brief resumé of the preceding remarks may be expressed as follows:

The Law of Similarity teaches us to select animals for breeding which possess the desired forms and qualities in the greatest perfection and best combination.

Regard should be had not only to the more obvious characteristics, but also to such hereditary traits and tendencies as may be hidden from cursory observation and demand careful and thorough investigation.

From the hereditary nature of all characteristics, whether good or bad, we learn the importance of having all desirable qualities and properties *thoroughly inbred*; or, in other words, so firmly fixed in each generation, that the next is warrantably certain to present nothing worse,—that no ill results follow from breeding back towards some inferior ancestor,—that all undesirable traits or points be, so far as possible, *bred out*.

So important is this consideration, that in practice, it is decidedly preferable to employ a male of ordinary external appearance, provided his ancestry be all which is desired, rather than a grade or cross-bred animal, although the latter be greatly his superior in personal beauty.

A knowledge of the Law of Divergence teaches us to avoid, for breeding purposes, such animals as exhibit variations unfavorable to the purpose in view; and to endeavor to perpetuate every real improvement gained; also to secure as far as practicable, the conditions necessary to induce or to perpetuate any improvement, such as general treatment, food, climate, habit, &c.

Where the parents do not possess the perfection desired, selections for coupling should be made with critical reference to correcting the faults or deficiencies of one by corresponding excellence in the other.

But to correct defects too much must not be attempted at once. Pairing those very unlike, oftener results in loss than in gain. Mating a horse for speed with a draft mare, will more likely beget progeny good for neither, than for both. Avoid all extremes, and endeavor by moderate degrees to obtain the object desired.

Crossing, between different breeds, for the purpose of obtaining animals for the shambles, may be advantageously practiced to considerable extent, but not for the production of breeding animals. As a general rule cross-bred males should not be employed for

propagation, and cross-bred females should be served by thoroughbred males.

In ordinary practice, breeding from near relationships is to be *scrupulously avoided;* for certain purposes, under certain conditions and circumstances, and in the hands of a skillful breeder, it may be practiced with advantage, but not otherwise.

In a large majority of cases (other things being equal) we may expect in progeny the outward form and general structure of the sire, together with the internal qualities, constitution and nutritive system of the dam; each, however, modified by the other.

Particular care should always be taken that the male by which the dam first becomes pregnant is the best which can be obtained; also, that at the time of sexual congress both are in vigorous health.

Breeding animals should not be allowed to become fat, but always kept in thrifty condition; and such as are intended for the butcher should never be fat but once.

In deciding with what breeds to stock a farm, endeavor to select those best adapted to its surface, climate, and degree of fertility; also with reference to probable demand and proximity to markets.

No expense incurred in procuring choice animals for propagation, or any amount of skill in breeding, can supersede, or compensate for, a lack of liberal feeding and good treatment. The better the stock, the better care they deserve.

Characteristics of Various Breeds.—The inquiry is frequently made, what is the best breed of cattle, sheep, &c., for general use in Maine; and it may be reasonably expected that some expression of opinion should be given. In reply it may be said that no breed can by any possibility fulfill all requirements in the best possible manner; one is better for meat and early maturity, another for milk, another for wool, and so on. Because under certain circumstances it may be necessary or advisable for a man to serve as his own builder, tailor, tanner and blacksmith, it by no means follows that all which is required will be as well, or as easily done, as by a division of labor. So it is better for many reasons, and more profit can be made, by employing different breeds for different purposes, than by using one for all, and towards such profitable employment we should constantly aim. At the same time there is a large class of farmers so situated that they cannot keep distinct breeds, and yet wish to employ them for different uses, and whose requirements

will best be met by a kind of cattle, which, without possessing remarkable excellence in any one direction, shall be sufficiently hardy for our changeable and severe climate, the oxen proving docile and efficient laborers for a while, and then turn quickly into good beef upon such food as their farms will produce, the cows giving a fair quantity and quality of milk for the needs of the family and perhaps to furnish a little butter and cheese for market.

Before proceeding to answer the inquiry more definitely, it may be well to remark further, that among the facts of experience regarding cattle, sheep and horses, nothing is better established than that no breed can be transferred from the place where it originated, and to which it was suited, to another of unlike surface, climate and fertility, and retain equal adaptation to its new situation, nor can it continue to be what it was before. It must and will vary. The influence of climate alone, aside from food and other agencies in causing variation, is so great that the utmost skill in breeding, and care in all other respects, cannot wholly control its modifying effects.

It is also pretty well established that no breed brought in from abroad can be fully as good, *other things being equal*, as one indigenous to the locality, or what approximates the same thing, as one, which by being reared through repeated generations on the spot has become thoroughly acclimated; so that the *presumption* is strongly in favor of *natives*.

When we look about us however, we find, if we except the Morgan horses, nothing which deserves the name of indigenous breeds or races. The cattle and sheep known as "natives" are of mixed foreign origin, and have been bred with no care in selection, but crossed up in every possible way. They possess no fixed hereditary traits, and although among them are many of very respectable qualities, and which possess desirable characteristics, they cannot be relied upon *as breeders, to produce progeny of like excellence*. Instead of constancy, there is continual variation, and frequent "breeding back," exhibiting the undesirable traits of inferior ancestors. That a breed might be established from them, by careful selection continued during repeated generations, aided perhaps by judicious crossing with more recent importations, fully as good as any now existing, is not to be doubted. Very probably, a breed for dairy purposes might be thus created which should excel any now existing in Europe, for some of our so called native cows, carelessly as they have been bred, are not surpassed by any of foreign

origin upon which great care has been expended. To accomplish this is an object worthy the ambition of those who possess the skill, enthusiasm, ample means and indomitable perseverance requisite to success. But except the single attempt of Col. Jaques, of the Ten Hills Farm, to establish the Creampot breed, of which, as little has been heard since his death, it is fair to presume that it has dropped into the level of common grade cattle, no systematic and continued effort has come to our knowledge. Consequently such as may be deemed absolutely the best for New England is a thing of the future; they do not yet exist—and there is no probability that the desideratum will soon be attained. We Yankees are an impatient people; we dislike to wait, for any thing, or to invest where five, ten, twenty or fifty years may be expected to elapse before satisfactory dividends may be safely anticipated.

Still, if all would begin to-day, to use what skill and judgment they have, or can acquire, in breeding only from the best of such as they have, coupling with reference to their peculiarities, and consigning to the butcher as fast as possible every inferior animal, and if, in addition, they would do what is equally necessary, namely, improve their general treatment as much as lies in their power, there would result an immediate, a marked and steadily progressive improvement in stock. To the acclimation or Americanization already acquired, would be added increased symmetry of form and greater value in many other respects. This is within the power of every man, and whatever else he may be obliged to leave undone, for want of ability, none should be content to fall short of this. Those who have the command of ample means will of course desire that improvement should be as rapid as possible. They will endeavor at once to procure well bred animals, or in other words, such as already possess the desired qualities so thoroughly inwrought into their organization that they can rely with a good degree of confidence on their imparting them to their progeny.

It may be well to allude here to a distinction between breeds and races. By *breeds*, are understood such varieties as were originally produced by a cross or mixture, like the Leicester sheep for example, and subsequently established by selecting for breeding purposes only the best specimens and rejecting all others. In process of time deviations become less frequent and greater uniformity is secured; but there remains a tendency, greater or less in proportion to the time which elapses and the skill employed in selection,

to resolve itself into its original elements, to breed back towards one or other of the kinds of which it was at first composed.

By *races*, are understood such varieties as were moulded to their peculiar type by natural causes, with no interferance of man, no intermixture of other varieties, and have continued substantially the same for a period beyond which the memory and knowledge of man does not reach. Such are the North Devon cattle, and it is fortunate that attention was drawn to the merits of this variety before facilities for intercommunication had so greatly increased as of late, and while yet the race in some districts remained pure. All that breeders have done to better it, is by selections and rejections from within itself; and so, much improvement has been effected without any adulteration. Consequently we may anticipate that so long as no crossing takes place, there will be no variation except such as is necessarily due to the conditions under which they are reared, as climate, food, habit and the like.

Among the established breeds of cattle the Improved Short-horns are the most fashionable, and the most widely diffused; and where the fertility of the soil, and the climate, are such as to allow the development of their peculiar excellencies, they take a high rank as a meat-producing breed. Their beef is deemed hardly equal in quality to that of the Devons, Herefords or Scots, the fat and lean being not so well mixed together and the flesh of coarser grain. But they possess a remarkable tendency to lay on fat and flesh, attaining greater size and weight, and coming earlier to maturity than any other breed. These properties, together with their symmetry and stately beauty, make them very popular in those counties of England, where they originated, and wherever else they have been carried, provided, their surroundings are such as to meet their wants. It is said that in the rich pastures of Kentucky and in some other parts of the west, they seem as much at home as on the banks of the Tees. The Short-horns have also been widely and successfully used to cross with most other breeds, and with inferior mixed cattle, as they are found to impress strongly upon them their own characteristics.

Without entering into the question of its original composition, or of its antiquity, regarding both of which much doubt exists, it may suffice here to say, that about a hundred years ago, Charles Colling and others entered zealously and successfully into an attempt to improve them by careful breeding, in whose hands they

soon acquired a wide spread fame and brought enormous prices; and the sums realized for choice specimens of this breed from that time to the present have been greater than for those of any other. Much of their early notoriety was due to the exhibition of an ox reared by Charles Colling from a common cow by his famous bull "Favorite," and known as the "Durham" ox, and also as the "Ketton" ox, (both which names have since then been more or less applied to the breed, but which are now mostly superceded by the original and more appropriate one of Short-horn,) which was shown in most parts of England and Scotland from 1801 to 1807, and whose live weight was between three and four thousand pounds and which was at one time valued for purposes of exhibition as high as $10,000.

The old Teeswater cattle were remarkably deep milkers, and although it does not appear that good grazing points necessarily conflict with excellence for the dairy, the fact is, that as improvement in feeding qualities was gained, the production of milk in most cases fell off; and although some families at the present time embrace respectable milkers, the great mass of them have deteriorated in this respect about in proportion to the improvement effected as meat-producing animals. The earlier Short-horns brought into Maine were from the very best milking families, and their descendants have usually proved valuable for dairy purposes—most of those more recently imported are quite unlike them in this respect. Several thorough-bred Short-horns were introduced into the State upwards of thirty years ago, the first of which was an aged bull "Denton," or "Young Denton" of the Herd book, imported by Mr. Williams of Massachusetts, and bred by Mr. Wetherell of Leicestershire, England; a remarkable animal for its combination of milking and feeding properties. The next, were several bred by Col. Jaques, and sired by his imported bull Cœlebs,* soon after which R. H. Greene, Esq., of Winslow, Sanford Howard, then residing in Hallowell, and others also introduced more or less. By crossing the males upon the common cows of the country the progeny inherited increased size and symmetry of form, more quiet dispositions, greater aptitude to feed and earlier maturity. They unquestionably effected great improvement, and the enterprising men who introduced and bred them deserve the gratitude

* The sire which he coupled with an excellent common cow as the foundation of his "Creampot" breed.

of the people of the State. Notwithstanding the abundant sneers and prejudices with which they were at first received, they gradually became highly esteemed, more of them have been introduced than of any other breed, and probably as much, if not more, of the improvement which has taken place in the cattle of the State for the last thirty years is due to these, as to any other: yet it may be true (as I believe it to be) that *as a pure breed they are not adapted to our wants.* Their size is beyond the ability of most Maine farmers to support profitably: crossed upon such as through neglect in breeding, scanty fare and exposure were bad feeders, too small in size, and too slow in growth, they effected great improvement in all these respects; and this improvement demanded and encouraged the bestowal of more food and better treatment, and so they prospered;—inheriting their *constitutions chiefly from the hardy and acclimated dams*, the grades were by no means so delicate and sensitive as the pure bred animals to the cold and changes of our severe climate so utterly unlike that of the mild and fertile region where they originated.

The lethargic temperament so characteristic of the Short-horn and which in the grades results in the greater quietness and docility so highly valued, necessarily unfits them for active work; pure bred animals being altogether too sluggish for profitable labor. This temperament is inseparably connected with their aptitude to fatten and early maturity, and these both demand abundant and nutritious food beyond the ability of most to supply and at the same time are incompatible with the activity of habit and hard service demanded of the working ox.

Now if we could be always sure of a supply of such dams as the Short-horns were first crossed with, at no more than they are worth, and if we could do no better, it would be advisible to keep on rearing grades or first crosses with this breed, but this would necessitate keeping up the "natives," which would not pay; and as all experience has shown that it is next to impossible to breed crosses among themselves without deterioration "running out" as it is called, and "breeding back," so as to reproduce the undesirable traits of former dams, the only safe course in breeding is to have constant recourse to a pure bred male and so be steadily approximating full blood; and these in the case now under consideration are objectionable as a general stock for the State, for the reasons already given. If we could find a sort of cattle to cross upon our common stock, which should itself, when pure bred or

nearly so, be well adapted in all respects to our situation, and fulfill our requirements, and would also produce the desired improvement in the grades, it would evidently be good policy to adopt it in preference to the Short-horn.

The North Devons are deemed to be of longer standing than any other of the distinct breeds of England, and they have been esteemed for their good qualities for several centuries. Mr. George Turner, a noted breeder of Devons, describes them as follows:—"Their color is generally a bright red, but varying a little either darker or more yellow; they have seldom any white except about the udder of the cow or belly of the bull, and this is but little seen. They have long yellowish horns, beautifully and gracefully curved, noses or muzzles white, with expanded nostrils, eyes full and prominent, but calm, ears of moderate size and yellowish inside, necks rather long, with but little dewlap, and the head well set on, shoulders oblique with small points or marrow bones, legs small and straight and feet in proportion. The chest is of moderate width, and the ribs round and well expanded, except in some instances, where too great attention has been paid to the hind quarters at the expense of the fore, and which has caused a falling off, or flatness, behind the shoulders. The loins are first rate, wide, long and full of flesh, hips round and of moderate width; rumps level and well filled at the bed; tail full near the rump and tapering much at the top. The thighs of the cows are occasionally light, but the bull and ox are full of muscle, with a deep and rich flank. On the whole there is scarcely any breed of cattle so rich and mellow in its touch, so silky and fine in its hair, and altogether so handsome in its appearance, as the North Devon, added to which they have a greater proportion of weight in the most valuable joints and less in the coarse, than any other breed, and also consume less food in its production.

As milkers they are about the same as most other breeds;—the general average of a dairy of cows being about one pound of butter per day from each cow during the summer months, although in some instances the very best bred cows give a great deal more.

As working oxen they greatly surpass any other breed. They are perfectly docile and excellent walkers, are generally worked until five or six years old, and then fattened at less expense than most other oxen."

The author of the report on the live stock shown at the exhibition of the Royal Agricultural Society at Warwick in 1859 (Mr. Robert Smith) says:

"Although little has been written on it, the improvement of the Devon has not been neglected; on the contrary, its breeding has been studied like a science, and carried into execution with the most sedulous attention and dexterity for upwards of two hundred years. The object of the Devon breeder has been to lessen those parts of the animal frame which are least useful to man, such as the bone and offal, and at the same time to increase such other parts (flesh and fat) as furnish man with food. These ends have been accomplished by a judicious selection of individual animals possessing the wished for form and qualities in the highest degree, which being perpetuated in their progeny in various proportions, and the selection being continued from the most approved specimens among these, enabled the late Mr. Francis Quartly at length to fully establish the breed with the desired properties. This result is substantially confirmed by the statistics contained in Davy's 'Devon Herd-Book.' We have been curious enough to examine these pedigrees, and find that nine-tenths of the present herds of these truly beautiful animals are directly descended (especially in their early parentage) from the old Quartly stock. Later improvements have been engrafted on these by the Messrs. Quartly of the present day. The example of various opulent breeders and farmers in all parts of the country has tended to spread this improvement, by which the North Devon cattle have become more general and fashionable. The leading characteristics of the North Devon breed are such as qualify them for every hardship. They are cast in a peculiar mold, with a degree of elegance in their movement which is not to be excelled. Their hardihood, resulting from compactness of frame and lightness of offal, enables them (when wanted) to perform the operations of the farm with a lively step and great endurance. For the production of animal food they are not to be surpassed, and in conjunction with the Highland Scot of similar pretension, they are the first to receive the attention of the London West-end butcher. In the show-yard, again, the form of the Devon and its rich quality of flesh serve as the leading guide to all decisions. He has a prominent eye, with a placid face, small nose and elegantly turned horns, which have an upward tendency (and cast outward at the end) as if to put the last finish upon his symmetrical form and carriage. These animals are beautifully covered with silken coats of a medium red color. The shoulder points, sides, and foreflanks are well covered with rich meat, which, when blended with their peculiar property of producing meat of first-rate quality

along their tops, makes them what they are—'models of perfection.' Of course, we here speak of the best-bred animals. Some object to the North Devon, and class him as a small animal, with the remark, 'He is too small for the grazier.' In saying this it should ever be remembered that the Devon has its particular mission to perform, viz., that of converting the produce of cold and hilly pastures into meat, which could not be done to advantage by large-framed animals, however good their parentage."

The Devons have been less extensively, and more recently, introduced into Maine than the Short-horn, but the universal experience of those who have fairly tried them fully sustains the opinions given above, and they promise soon to become a very favorite and prevailing breed. The usual objection made to them by those who have been accustomed to consider improvement in cattle to be necessarily connected with enlargement of size, is, that they are too small. But their size instead of being a valid objection, is believed to be a recommendation, the Devons being fully as large as the fertility of Maine soils generally are *capable of feeding fully and profitably.*

Their qualities as working oxen are unrivalled, no other breed so uniformly furnishing such active, docile, strong and hardy workers as the Devons, and their uniformity is such as to render it very easy to match them. Without possessing so early maturity as the Short-horn, they fatten readily and easily at from four to six years old, and from their compact build and well balanced proportions usually weigh more than one accustomed to common cattle would anticipate.

Among the earlier introducers of Devons into Maine, were Messrs. Percival of Waterville, and Tufts of Paris. The largest herds at present, so far as my knowledge extends, are those of Messrs. Wentworth of Poland, and Anderson of South Windham. Mr. Wentworth's stock were selected and have been propagated chiefly with reference to produce in beef and labor, while Mr. Anderson has labored assiduously and successfully to secure increased dairy properties in addition to these. The Devons are not generally deep milkers but the milk is richer than that of most other breeds, and some families, where proper care and attention have been given to this quality in breeding, yield largely. It is, however, as a breed for general use, combining beef, labor and milk, in fair proportion, that the Devons will generally give best satisfaction, as they are not only hardy enough to suit the climate,

but are believed capable of furnishing more service and more and better beef upon the average of Maine farms than any other breed.

Farmers, whose ideas upon stock have been formed wholly from their experience with Short-horns and their grades, have often been surprised at witnessing the facility with which Devons sustain themselves upon scanty pasturage, and not a few when first critically examining well bred specimens, sympathize with the feeling which prompted the remark made to the reporter of the great English Exhibition at Chester, after examining with him fine specimens of the Devons—"I am delighted; I find we Short-horn men have yet much to learn of the true formation of animals; their beautiful contour and extreme quality of flesh surprise me."

The Herefords are an ancient and well established breed, and are probably entitled to be called a race. Little is known with certainty of their origin beyond the fact that for many generations they can be traced as the peculiar breed of the county whence they derive their name. Youatt says that "Mr. Culley, although an excellent judge of cattle, formed a very erroneous opinion of the Herefords when he pronounced them to be nothing but a mixture of the Welsh with a bastard race of Long Horns. They are evidently an aboriginal breed, and descended from the same stock as the Devon. If it were not for the white face and somewhat larger head and thicker neck it would not at all times be easy to distinguish between a heavy Devon and a light Hereford."

Mr. Gisborne says "The Hereford brings good evidence that he is the British representative of a widely diffused and ancient race. The most uniform drove of oxen which we ever saw, consisted of five hundred from the Ukraine. They had white faces, upward horns and tawny bodies. Placed in Hereford, Leicester or Northampton markets, they would have puzzled the graziers as to the land of their nativity; but no one would have hesitated to pronounce that they were rough Herefords."

Mr. Rowlandson, in his prize report on the farming of Herefordshire, says "The Herefords, or as they have sometimes been termed, the middle horned cattle have ever been esteemed a most valuable breed, and when housed from the inclemency of the weather, probably put on more meat and fat in proportion to the food consumed, than any other variety. They are not so hardy as the North Devon cattle, to which they bear a general resemblance; they however are larger than the Devons, especially the males. On the other hand, the Herefords are larger boned, to compensate

for which defect, may be cast in the opposite scale the fact that the flesh of the Hereford ox surpasses all other breeds for that beautiful marbled appearance caused by the intermixture of fat and lean which is so much prized by the epicure. The Hereford is usually deeper in the chine, and the shoulders are larger and coarser than the Devon. They are worse milkers than the Devon, or than, perhaps, any other breed, for the Hereford grazier has neglected the female and paid the whole of his attention to the male." It is said that formerly they were of a brown or reddish brown color, and some had grey or mottled faces. Mr. P. Tully states that the white face originated accidentally on a farm belonging to one of his ancestors. "That about the middle of the last century the cowman came to the house announcing as a remarkable fact that the favorite cow had produced a white faced bull calf. This had never been known to have occurred before, and, as a curiosity it was agreed that the animal should be kept and reared as a future sire. Such, in a few words, is the origin of a fact that has since prevailed through the country, for the progeny of this very bull became celebrated for white faces." Of late years there has been much uniformity of color; the face, throat, the under portion of the body, the inside and lower part of the legs and the tip of the tail being white, and the other parts of the body a rich deep red.

Compared with the Short-horn the Hereford is nearly as large, of rather less early maturity, but a better animal for grazing, and hardier. The competition between these breeds in England is very close and warm, and taking many facts together it would seem probable that the Hereford is really the more profitable animal to rear, and the Short-horn decidedly the more fashionable one. Challenges have been repeatedly offered by Hereford men to Short-horn men to feed an equal number of each in order to test their respective merits, and have been declined, perhaps because if the decision was against them, the loss might be serious, and if they won, the gain would be little or nothing, the Short-horns being more popular already and commanding higher prices.

As working oxen the Herefords are preferable to the Short-horns, being more hardy and active. Some complaint is made of their being "breechy." Their large frames demand food, and if enough be furnished they are content, but if not, they have intelligence and activity enough to help themselves if food be within reach. Their chief merit is as large oxen, for heavy labor, and for beef. Some grade cows from good milking dams give a fair quantity of milk,

and what they give is always rich, but wherever they have been introduced, milking qualities generally deteriorate very much. Their size, too, is beyond the capacity of most Maine farms to feed easily to the point of greatest profit.

The Ayrshires are a breed especially valuable for dairy purposes. Regarding its origin, Mr. Aiton who felt much interest in the subject, and whose opportunities for knowing the facts were second to those of no other, writing about forty years since, says, "The dairy breed of cows in the county of Ayr now so much and so deservedly esteemed is not in their present form an ancient or indigenous race, but a breed formed during the memory of living individuals, and which have been gradually improving for more than fifty years past, till now they are brought to a degree of perfection that has never been surpassed as dairy stock in any part of Britain, or probably in the world. They have increased to double their former size, and they yield about four and some of them five times as much milk as formerly. By greater attention to breeding and feeding, they have been changed from an ill-shaped, puny, mongrel race of cattle to a fixed and specific breed of excellent color and quality. So gradually and imperceptibly were improvements in the breed and condition of the cattle introduced, that although I lived in Ayrshire from 1760 to 1785, and have traversed it every year since, I have difficulty in stating from my own observation or what I have learned from others, either the precise period when improvement began, or the exact means by which a change so important was wrought." He then relates several instances in which between 1760 and 1770 some larger cows were brought in of the English or Dutch breeds, and of their effect he says, "I am disposed to believe that although they rendered the red color with white patches fashionable in Ayr, they could not have had much effect in changing the breed into their present highly improved condition," and thinks it mainly due to careful selections and better treatment.

Mr. Aiton says "the chief qualities of a dairy cow are that she gives a copious draught of milk, that she fattens readily and turns out well in the shambles. In all these respects combined the Ayrshire breed excels all others in Scotland, and is probably superior to any in Britain. They certainly yield more milk than any other breed in Europe. No other breed fatten faster, and none cut up better in the shambles, and the fat is as well mixed with the lean flesh, or marbled, as the butchers say, as any other. They always

turn out better than the most skillful grazier or butcher who are strangers to the breed could expect on handling them. They are tame, quiet, and feed at ease without roaming, breaking over fences, or goring each other. They are very hardy and active, and are not injured but rather improved by lying out all night during summer and autumn."

Since Mr. Aiton wrote, even greater care and attention has been paid to this breed than before, and it is now well entitled to rank as the first dairy breed in the world, quantity and quality of yield being both considered. Compared with the Jersey, its only rival as a dairy breed, the milk of the Ayrshire is much more abundant and richer in caseine, but not so rich in oily matter, although better in this respect than the average of cows.

Experience of their qualities in this country shows that if they do not here fully sustain their reputation in Scotland, they come near to it, as near as the difference in our drier climate allows, giving more good milk upon a given amount of food than any other. Upon our ordinary hilly pastures they yield largely and prove very hardy and docile. The oxen too are good workers, fatten well, and yield juicy, fine flavored meat. They are rapidly coming into favor wherever proved.

The JERSEY race, formerly known as the Aldernay, is almost exclusively employed for dairy purposes, and may not be expected to give satisfaction for any other use. Their milk is richer than that of any other cows, and the butter made from it possesses a superior flavor and a deep rich color, and consequently commands an extraordinary price in all markets where good butter is appreciated.

The Jersey cattle are of Norman origin, and until within about twenty or thirty years were far more uninviting in appearance than now, great improvement having been effected in their symmetry and general appearance by means of careful selections in breeding, and this without loss of milking properties. The cows are generally very docile and gentle, but the males when past two or three years of age often become vicious and unmanageable. It is said that the cows fatten readily when dry, and make good beef.

So far as I am able to judge from an examination of the neat stock of the State, there is no branch of cattle husbandry which promises better returns than the breeding and rearing of good milch cows. Here and there are to be found some good enough. In the vicinity of our larger towns are many which having been

culled from many miles around, on account of dairy properties, are considerably above the average, but taking the cows together they by no means compare with the oxen. Farmers generally take much pride in their oxen, and strive to have as good or better than any of their neighbors, while if a cow will give milk enough to rear a big steer calf and a little besides, it is often deemed fully satisfactory.

If the frequent inquiries made for choice milking animals, especially by residents in cities and larger towns, and these accompanied by the expression of willingness to pay the price of a tolerable yoke of oxen for one really good cow, be sufficient ground for an opinion, it would seem probable that increased attention to dairy qualities, and the culture of breeds especially for milking purposes, would pay very handsome profits.

Sheep have been kept in the State to a greater or less extent ever since its early settlement. Those first introduced were of English origin, and generally not very dissimilar to the ancient unimproved South Downs. Probably many were these—as many of the first cattle of New England were the Devons of that day. During the war of 1812–'15 and subsequently the Merinos were introduced and extensively bred. At various periods other breeds have been introduced. The number kept has fluctuated exceedingly, depending mainly on the market value of wool. When it was high all kept sheep, and when it fell the flocks were neglected.

The true mission of the sheep in fulfilling the threefold purpose of furnishing *food* and *raiment, and the means of fertilization*, seems not yet to be generally apprehended. One of the most serious defects in the husbandry of Maine at the present time, is the prevalent neglect of sheep. Ten times the present number might be easily fed, and they would give in meat, wool and progeny, more direct profit than any other domestic animal, and at the same time the food they consume would do more towards fertilizing the farms than an equal amount consumed by any other animal.

It is an undoubted fact that of late years sheep husbandry has seriously declined in the State at large, very few being kept compared with the number at some former periods. It is equally notorious that our pastures are seriously deteriorating in fertility and becoming overrun with worthless weeds and bushes to the exclusion of nutritious grasses. If these two facts as uniformly stand to each other in the relation of cause and effect, as they cer-

tainly do in many instances, the remedy is suggested at once—replace the animal with "golden feet." After devoting the best of our land to cultivation and the poorest to wood, we have thousands upon thousands of acres evidently intended by the Creator for sheep walks, because better adapted for this purpose than for any other. An indication of Providence so unmistakable as this should not be unheeded.

The Merinos are perhaps the most ancient race of sheep extant. They originated in Spain, and were for ages bred there alone. In 1765 they were introduced into Saxony, where they were bred with care and with special reference to increasing the fineness of the wool, little regard being paid to other considerations. They were also taken to France and to Silesia, and from all these sources importations have been made into the United States. The Spanish Merino has proved the most successful, and by skill and care in breeding has been greatly improved, insomuch that intelligent judges are of opinion that some of the Vermont flocks are superior to the best in Europe, both in form, hardiness, quantity of fleece and staple. They are too well known to require a detailed description here. Suffice it to say that they are below rather than above medium size, possessing a good constitution, and are thrifty, and cheaply kept. Their chief merit is as fine wooled sheep, and as such they excel all others. As mutton sheep they are constitutionally and anatomically deficient, being of late maturity and great longevity, (a recommendation as fine wooled sheep,) having too flat sides, too narrow chests, too little meat in the best parts, and too great a percentage of offal when slaughtered. Their mutton, however, is of fair quality when mature and well fatted. As nurses they are inferior to many other breeds. Many careful, extensive and protracted attempts have been made to produce a breed combining the fleece of the Merino with the carcass of the Leicester or other long wooled sheep. They have all signally failed. The forms, characteristics and qualities of breeds so unlike seem to be incompatible with one another. A cross of the Merino buck and Leicester ewe gives progeny which is of more rapid growth than the Merino alone, and is hardier than the Leicester. It is a good cross for the butchers' use, but not to be perpetuated. Improvement in the Merino should be sought by skillful selection and pairing the parents in view of their relative fitness to one another.

The Leicester, or more properly the New Leicester, is the breed which Bakewell established, and is repeatedly referred to in the pre-

ceding pages. It has quite superseded the old breed of this name. His aim was to produce sheep which would give the greatest amount of meat in the shortest time on a given amount of food, and for early maturity and disposition to fatten, it still ranks among the highest. The objections to the breed for our situation are that they are not hardy enough for the climate, and require richer pastures and more abundant food than most Maine farmers can supply. Its chief value here is for crossing upon ordinary sheep for lambs and mutton.

The Cotswolds derive their name from a low range of hills in Gloucestershire. These have long been noted for the numbers and excellence of the sheep there maintained, and are so called from Cote, a sheepfold, and Would, a naked hill. An old writer says: "In these woulds they feed in great numbers flocks of sheep, long necked and square of bulk and bone, by reason (as is commonly thought) of the weally and hilly situation of their pastures, whose wool, being most fine and soft, is held in passing great account amongst all nations." Since his time, however, great changes have passed both upon the sheep and the district they inhabit. The improved Cotswolds are among the largest British breeds, long wooled, prolific, good nurses, and of early maturity. More robust, hardy and less liable to disease than the Leicesters, of fine symmetry and carrying great weight and light offal, they are among the most popular of large mutton sheep.*

The South Down is an ancient British breed, taking its name from a chalky range of hills in Sussex and other counties in England about sixty miles in length, known as the South Downs, by the side of which is a tract of land of ordinary fertility and well calculated for sheep walks, and on which probably more than a million of this breed of sheep are pastured. The flock tended by the "Shepherd of Salisbury Plain," of whose earnest piety and simple faith Hannah More has told us in her widely circulated tract, were South Downs. Formerly these sheep possessed few of the attractions they now present. About the year 1782 Mr. John Ellman of Glynde turned his attention to their improvement.

*At the last show of the York County Agricultural Society, some very superior specimens of this breed were exhibited by Mr. Henry Jordan of Kennebunk, who obtained them at a recent sale of Geo. C. Hitchcock of New Preston, Conn., whose flock has been reputed the best in the country. The buck shown, "Cedric, Jr.," was sired by imported buck "Cedric," figured in the last volume of Agriculture of Maine, (see frontispiece to abstract of returns for 1859,) and is nearly a fac simile of his sire. He brought the highest price of any one disposed of at the sale—$150.

Unlike his cotemporary Bakewell, he did not attempt to make a new breed by crossing, but by attention to the principles of breeding, by skillful selections for coupling and continued perseverance for fifty years, he obtained what he sought—health, soundness of constitution, symmetry of form, early maturity, and facility of fattening, and thus brought his flock to a high state of perfection. Before he began we are told that the South Downs were of "small size and ill shape, long and thin in the neck, high on the shoulders, low behind, high on the loins, down on the rumps, the tail set on very low, sharp on the back, the ribs flat," &c., &c., and were not mature enough to fatten until three years old or past. Of his flock in 1794, Arthur Young* says: "Mr. Ellman's flock of sheep, I must observe in this place, is unquestionably the first in the country; there is nothing that can be compared with it; the wool is the finest and the carcass the best proportioned; although I saw several noble flocks afterwards which I examined with a great degree of attention; some few had very fine wool, which might be equal to his, but then the carcass was ill-shaped, and many had a good carcass with coarse wool; but this incomparable farmer had eminently united both these circumstances in his flock at Glynde. I affirm this with the greater degree of certainty, since the eye of prejudice has been at work in this country to disparage and call in question the quality of his flock, merely because he has raised the merit of it by unremitted attention above the rest of the neighboring farmers, and it now stands unrivalled." This, it will be noticed, was only twelve years after he began his improvements. To Mr. Ellman's credit be it said that he exhibited none of the selfishness which characterized Mr. Bakewell's career, but was always ready to impart information to those desirous to learn, and labored zealously to encourage general improvement. That he was pecuniarily successful is evident from the continued rise in the price of his sheep. The Duke of Richmond, Mr. Jonas Webb, Mr. Grantham, and other cotemporaries and successors of Mr. Ellman have carried successfully forward the work so well begun by him. The Improved South Downs now rank first among British breeds in hardiness, constitution, early maturity, symmetry, and quality of mutton and of wool combined. The meat usually brings one or two cents per pound more than that of other breeds in Smithfield market. It is of fine flavor, juicy, and well marbled, i. e., the fat

* Annals of Agriculture, Vol. 11, p. 224.

well intermixed with the lean. The South Downs are of medium size, (although Mr. Webb in some cases attained a live weight in breeding rams of 250 pounds, and a dressed weight of 200 pounds in fattened wethers,) hardy, prolific, and easily kept, succeeding on short pastures, although they pay well for liberal feeding. Descendents from the flocks of the Duke of Richmond, Mr. Webb and other breeders have been introduced into the State, though as yet but sparingly.*

The Oxford Downs may be named as an instance of successful cross-breeding. They originated in a cross between the Improved Cotswolds and the Hampshire Downs.† Having been perpetuated now for more than twenty years, they possess so good a degree of uniformity as to be entitled to the designation of a distinct breed, and have lately been formally recognized as such in England. They were first introduced into Massachusetts by R. S. Fay, Esq., of Lynn, and into Maine by Mr. Sears, who has a flock of fifty or upwards on Brigadier's Island near Searsport. They were first bred with a view to unite increased size with the superiority of flesh and patience of short keep which characterize the Downs. It is understood that they inherit from the Cotswold a carcass exceeding in weight that of the Downs from a fifth to a quarter; a fleece somewhat coarser but heavier than that of the Downs by one-third to one-half; and from the latter they inherit rotundity of form and fullness of muscle in the more valuable parts, together with the brown face and leg.

In reply to a note of inquiry addressed to Mr. Fay, he says: "I selected the Oxford Downs with some hesitation as between them and the Shropshire Downs, after a careful examination of all the various breeds of sheep in England. My attention was called to them by observing that they took, (1854,) without any distinct name, all the prizes as mutton sheep at Birmingham and elsewhere, where they were admitted to compete. They were only known under the name of half or cross bred sheep, with name of the breeder. Mr. Rives of Virginia and I went into Oxfordshire to look at them, and so little were they known as a class, that Philip Pusey, Esq., President of the Royal Agricultural Society, knew nothing about them, although one of his largest tenants, Mr. Druce,

* Messrs. Anderson of South Windham, and Perley of Naples, in Cumberland county, have introduced flocks of pure sheep of this breed during the past autumn.

† The Hampshires are somewhat larger than the South Downs, and quite as hardy—the fleece a trifle shorter.

had long bred them. It is only within two years that they were formally recognized at a meeting, I believe, of the Smithfield club, and they then received the name which I gave them years ago, of Oxford Downs. By this name they are now known in England. I can only add that an experience of six years confirms all that is claimed for them. Fifty-two ewes produced seventy-three healthy lambs from February 13th to March 15th, this year. The same ewes sheared an average of more than seven pounds to the fleece, unwashed wool, which sold for 34 cents per pound. A good ram should weigh as a shearling from 180 to 250 pounds; a good ewe from 125 to 160 pounds. They fatten rapidly, and thrive on rough pasture. My flock, now the older and poorest ones have been disposed of, will average, I have no doubt, eight pounds wool to the fleece. The mutton is exceedingly fine and can be turned into cash in 18 months from birth."

In a Prize Report on the Farming of Oxfordshire by Clare Sewell Read, published in the Journal of the Royal Agricultural Society, in 1855, is a detailed account of these sheep under the name of Down Cotswold. As so little is yet known of them among us even by name, and as the account is an interesting one, it is here quoted. The writer after giving an account of the various breeds of sheep kept in that county, goes on to say:

"But the present 'glory of the county'—the most profitable sheep to the producer, the butcher, and the consumer, are the half-breds. Yet this is not a well defined appellation, as the names of animals ought to convey a description of their properties. Now, a cross between the Ryland and the Welsh, or Cheviot and Highland sheep, are half-breds, but they are not the half-breds of Oxfordshire. A more intelligible name for this class of sheep, and one which might be generally used, would be the Down Cotswold. The Down Cotswold sheep of this county were originally a cross between the Cotwsold ram and Hampshire Down ewe; but the cross having been bred from for nearly twenty years without the infusion of any fresh blood, *has become a distinct breed of sheep: quite as distinct and quite as pure as the sort called Shropshire Downs.* In fact these two varieties resemble each other so much that, when classed together at Gloucester, many considered them one kind of sheep. The Shropshires are very useful, and a credit to any county, yet there is little doubt that they were originally formed by a mixture of long and short wooled blood. The superiority of the Down Cotswold sheep consists in their retaining the excellencies of those celebrated breeds without their defects. Thus they combine the early maturity, heavy carcass, and ample fleece of the Cotswold, with the fine wool and mutton of the Downs. They do not indeed, in meat or fleece, come up to the full weight

of the Cotswold, but in moneyed value there is little difference. The half-bred tegs may average 9 stone, and clip 7 or 8 pounds of wool: they will bear harder folding, and fatten with less food than the Cotswold. If a farmer kept 100 Cotswolds, he could maintain 115 Down Cotswolds, the same number of Hampshires, and 120 South Downs on the same food. The farmers on the stone brash seldom keep more than 75 sheep to 100 acres, while the occupiers of the light loams about Oxford generally have double that number, and sometimes as many as two sheep to an acre.

As compared with Short-wools, on the other hand, one gentleman, who had formerly kept Downs, assigned the following reason for exchanging them for Down Cotswolds. Eight years ago he had 100 lambs of each sort: the lots cost exactly the same price, were folded side by side, on turnips through the winter, and both were fed exactly alike. In the spring the cross-breds sold for 12s. per head more than the Downs. In feeding these two sorts of sheep on dirty land, the Downs with short close coats do not keep themselves so clean as the half-breds. The Down is constantly moving about, and will amble round a turnip, and walk about his fold, while his less active neighbor will eat his fill and quietly lie down. The Downs may have a better quality of mutton, but the excellence of Down mutton is not appreciated when young. A Down Cotswold sheep at fifteen months old will produce as good a quality of meat as a Down of the same age, to say nothing of extra weight. Certainly, if Downs are kept till two years old they make splendid sheep and are much in request, but there are not many farmers who can afford to keep Down sheep 24 months, when they can fatten others in almost half the time. Where there are extensive Downs, and sheep are valued for their manure more than for their mutton, and can be kept at a small cost till they are a year old or more, there Downs are best: but for consuming crops on arable land in hurdles, and for producing a great and rapid supply of the best meat and wool, (and this is not only an agricultural but a national advantage,) the half-bred sheep stand unrivalled.

Some will contend that the Leicesters and South Downs are a better cross, but both breeds are too fine, and will not produce the *size* of the Oxfordshire half-breds. Although the farmers of this county possess the advantage of having their two favorite pure breeds of sheep within easy distances, yet many prefer breeding from half-bred sheep to producing the first cross themselves. They may well prefer breeding their own ewes, which is incompatible with keeping to the first cross; and as few farmers sell their best ewes, it is almost impossible to keep up a good breeding flock by purchasing. The old ewes are fatted or sold to the Buckinghamshire men, who take one lamb and then graze them. Whether fed off or sold lean, the half-breds make the most money.

The produce of good and well selected cross-bred ewes and rams are now more uniform in color and size than sheep bred from Down mothers and Cotswold sires. There formerly existed much difficulty in keeping a newly-formed half-bred flock to one character. The first cross and their produce will be dissimilar; some will par-

take too much of the long wool, while others are too small and short-coated. The owner formerly divided his flock into three parts, putting a half-bred ram to the ewes that were about right, a Cotswold to the small ones, and a Down to the coarser sheep. By constant attention to these points a flock may be brought to some degree of uniformity, but the breeder frequently found that if the fleece was a little too short, or the face rather too white, by using pure Cotswold or Down rams he rushed into the other extreme, the produce too much resembling their sires. There is now no need of running back to the pure breeds, as there are numerous Down Cotswold rams to be found varying in size, color and wool, according to the fancy of the breeder, which will meet the deficiencies of any half-bred flock. Some farmers have failed in preserving the true character of the Down Cotswold from using inferior rams. Because the ewes were mongrels, they thought any cross-bred sheep with a gray face would do. No such thing; the less distinct the breed of ewes, the more pure and well bred should be the ram; consequently a sheep should be procured from the oldest and best Down Cotswold breeders. The lambs would be more like the ram, and so produce a more even lot of sheep than if he had been put to any true bred flock."

The kind of sheep most desirable on the whole in any given case, depends chiefly on the surface, character and fertility of the farm and its location. At too great a distance from a good meat market to allow of a profitable sale of the carcass, the Spanish Merino is doubtless to be preferred, but if nearer, the English breeds will pay better. Mutton can be grown cheaper than any other meat. It is daily becoming better appreciated, and strange as it may seem, good mutton brings a higher price in Boston market and in many large towns than the same quality does in England. Its substitution in a large measure for pork would contribute materially to the health of the community.

Winter fattening of sheep may often be made very profitable and deserves far greater attention, especially where manure is an object—(and where is it not?) In England it is considered good policy to fatten sheep if the increase of weight will pay for the oil cake or grain consumed; the manure being deemed a fair equivalent for the other food, that is, as much straw and turnips as they will eat. Lean sheep there usually command as high a price per pound in the fall as fatted ones in the spring, while here the latter usually bear a much higher price, which gives the feeder a great advantage. The difference may be best illustrated by a simple calculation. Suppose a wether of a good mutton breed weighing 80 pounds in the fall to cost 6 cents per pound ($4.80) and to require 20 pounds of hay per week, or its equivalent in other food,

and to gain a pound and a half each week, the gain in weight in four months would be about 25 pounds, which at 6 cents per pound would be $1.50 or less than $10 per ton for the hay consumed; but if the same sheep could be bought in fall for 3 cents per pound and sold in spring for 6 cents, the gain would amount to $3.90 or upwards of $20 per ton for the hay—the manure being the same in either case.

For fattening it is well to purchase animals as large and thrifty and in as good condition as can be done at fair prices; and to feed liberally so as to secure as rapid increase as can be done without waste of food.

The fattening of sheep by the aid of oil cake or grain purchased for the purpose, may often be made a cheaper and altogether preferable mode of obtaining manure than by the purchase of artificial fertilizers, as guano, superphosphate of lime, &c. It is hoped that the plan may have a fair and extended trial.

Horses. It is gratifying to know that in the matter of rearing horses there is an increasing and more enlightened interest manifesting itself in the introduction of valuable stock for propagation, and not only is this true of sires but of dams also.

As has been already remarked in regard to neat stock, we have horses enough already among us, so far as numbers go, and among them by no means an inconsiderable proportion of valuable animals; yet so long as it costs no more to rear one which will readily command a round price, than one which would be dear at any sum, however small, it is unquestionably the better policy to endeavor to bring up the whole stock of the State to a much higher standard.

Our suggestion as to the means by which this is to be effected, is this:—In the first place let far more care be taken in respect of breeding mares. Let none be bred from which are too old, or of feeble constitution, or the subjects of hereditary disease. No greater mistake can be made than to suppose that a mare fit for nothing else, is worthy to be bred from. If fit for this, she is good for much else—gentle, courageous, of good action, durable and good looking; outward form is perhaps of less value than in the male, but serious defect in this greatly lessens her value. She should be *roomy*, that is the pelvis should be such that she can well develop and easily carry and deliver the foal.

Youatt says, "it may, perhaps, be justly affirmed that there is

more difficulty in selecting a good mare to breed from, than a good horse, because she should possess somewhat opposite qualities. Her carcass should be long to give room for the growth of the fœtus, yet with this there should be compactness of form and shortness* of leg."

The next point is the selection of a stallion. It is easy enough to say that he should be compactly built, "having as much goodness and strength as possible condensed in a little space," and rather smaller relatively than the mare, that he should be of approved descent and possess the forms, properties and characteristics which are desired to be perpetuated. It is not very difficult to specify with tolerable accuracy what forms are best adapted for certain purposes, as an oblique shoulder and depth rather than width of chest are indispensable for trotting; that in a draft horse this obliquity of shoulder is not wanted, one more upright being preferable, and so forth; but after all, a main point to secure success is *relative adaptation of the parents to each other*, and here written directions are necessarily insufficient and cannot supply the place of skill and judgment to be obtained only by careful study and practical experience, nor is it always easy, even if fully aware of the necessary requirements, to find them in the best combination in the horses nearest at hand. A stallion may be all which can be desired for one dam and yet be very unsuitable for another. In this aspect we can perceive what valuable results to the horse stock of the State may accrue from such an establishment as that of T. S. Lang, Esq., at North Vassalboro', where not a single stallion only is kept, but many, and where no pains nor expense are spared to secure the presence of superior specimens of the most approved breeds, and choice strains of blood in various combinations; so that the necessary requirements in a sire are no sooner fairly apprehended than they are fully met. On this point therefore, my suggestion is, that this relative adaptation of the parents to one another be made the subject of more careful study than heretofore: and a word of caution is offered lest in the decisions made, too great importance be attached to speed alone. That speed is an element of money value is not to be doubted, nor would I intimate that he who breeds horses to sell, may not aim to adapt his wares to his market as much as the man who breeds neat cattle and sheep, or

* Mr. Youatt here probably refers to length below, rather than above, the knee and hock.

raises potatoes for sale. I only say that speed may be sought at too dear a rate, and that bottom, courage, docility and action are equally elements of money value and equally worthy of being sought for in progeny. It is not unlikely that an attempt to breed for these last named qualities would result in the production of as many fast horses as we now get, and in addition to this a much higher average degree of merit in the whole number reared.

Another suggestion may not be out of place. Hitherto (if we except fast trotting) there has been little attempt to breed for special purposes, as for draft horses—for carriage horses, etc., and the majority of people at the present time undoubtedly prefer horses of all work. This is well enough so long as it is a fact that the wants of the masses are thus best met, but it is equally true that as population increases in density and as division of labor is carried farther, it will be good policy to allow the horse to share in this division of labor, and to breed with reference to different uses; just as it is good policy for one man to be a carpenter, another a blacksmith, and another a shoemaker. The same principle holds in either case.

For several years it has been a cherished plan with me to investigate and report upon the agriculture of different sections of the State in greater detail than I have yet been able to do. The only approximation to it which other and urgent claims have allowed me to accomplish, was the account given of Aroostook in the report for 1857.

As at that time I found little or no interest generally felt in regard to the settlement of our new lands, formerly reported fertile but latterly forgotten and neglected, there seemed a special demand in this case for careful and impartial investigation, and a somewhat lengthy and detailed report, which demand I responded to with such ability as I could.

The value of careful and thorough agricultural surveys has been fully demonstrated in Great Britain, where for many years past the National Societies have offered liberal premiums for them. Of many counties there, we have, in the published surveys, ample details of the modes of practice, the stock and all which pertains to the agriculture of the district, and which doubtless served the immediate purpose designed, by imparting information, effecting improvements and awakening interest, and are also at the present time invaluable for reference.

It may be doubted if our own County Societies could make a wiser appropriation of a portion of their means, than by securing the services of competent persons to be employed for this object, either by liberal prizes offered for the best survey or by some other method.

It is with much pleasure that I am able here to present, through the voluntary labors of one of its public spirited citizens and a practical farmer, an agricultural survey of Somerset county; and I do so with the hope that this will not long remain the only county thus surveyed and reported upon.

AGRICULTURAL SURVEY

OF

SOMERSET COUNTY.

BY SAMUEL L. BOARDMAN.

Introduction.

In the present survey I have given an outline of the geography and geology of Somerset county, together with some notice of its agricultural capabilities and remarks upon its staple productions. It has been my aim to render it as complete and reliable as possible, and what has been stated as fact will be found correct. My own views and suggestions have not been made without observation and reflection, and will, I hope, receive that attention which they merit, and no more.

Some account of the geography and geology of the county has been presented. A chapter upon meteorology also occupies a place. I have found no one who has taken sufficient interest in the matter to keep a record of the fall of rain, or of the temperature in the county. What tables of this character I have inserted, were furnished me by a gentleman connected with Waterville College, and by Hon. R. H. Gardiner of Gardiner. Though not properly belonging to this county, I have made use of them in the absence of any such registers kept within the limits of Somerset.

In speaking of the general practices of the husbandry in the county, reference is made to the thirty incorporated towns. For the information contained in that division of my subject relating to the lands in the northern portion of the county, I am under obligation to a gentleman well acquainted with the localities, and more largely engaged in lumbering operations than any other person in the county. With regard to the staple productions and the modes of cultivation, I have sought information from the most authentic sources, and from some of the most practical cultivators in the county. The practices of farmers, even in doing the same thing,

or in the cultivation of the same crop, differ so widely that it is often a difficult matter to state the prevailing customs. Farm journals or accounts are not kept, and hence many otherwise intelligent men are unable to give a very satisfactory or complete statement of their doings.

The author believes this to be the first treatise where a general view of the agriculture of any county in the State has been given. There are many imperfections in the work, but I hope its publication will give an opportunity to have them pointed out and corrected, and lead others to efforts in the same direction, until complete surveys of the agricultural resources and capabilities of every county in the State shall be given to the public. Such reports would become the most valuable agricultural treatises of the day.

In order that such surveys may be written and published, would it not be well for our agricultural societies to offer premiums for the best written and most carefully prepared surveys of entire, or parts of the counties where such societies are located?

South Norridgewock, October, 1860.

I.—Topographical Description of the County.

That portion of the State of Maine comprised within the limits of Somerset county—being that part included in the present survey—is bounded on the north by Aroostook county and Canada East, on the east by Piscataquis and Penobscot counties, on the south by the county of Kennebec, and on the west by Franklin county and Canada East. It lies between latitude 44 deg. 30 min. and 46 deg. 30 min. north; and longitude 69 deg. and 71 deg. west from Greenwich—the extreme length of the county being two hundred miles, and its greatest width forty-two. It is divided into thirty towns and forty-seven townships and plantations, besides containing a million of acres of unsurveyed territory. According to the census of 1850, the population was 35,582.

The county is well watered. Moosehead lake, which is forty miles long and forms part of the boundary between this and Piscataquis county, gives rise to the Kennebec, one of the most important rivers in the State. It runs in a southwesterly course through three ranges of townships, where it forms a junction with Dead

river at the Forks plantation. From Caratunk the Kennebec divides the towns as it flows for thirty miles in a course directly south, until it enters Norridgewock in the western part of the town, and passes through it in an easterly direction, after which it separates Skowhegan from Bloomfield, and Fairfield from Benton in Kennebec county, at which place it reaches its most eastern point. There are several islands of considerable extent in the river, and rapids which affords employment to machinery in working up the lumber cut upon its head-lands, and run down its waters. The valley of the Kennebec comprises some of the first cleared lands in the county, and the farms are all of superior excellence. Taken together, there is but little interval upon the river, the banks in most places being high, but the soil is of fine texture and well adapted to all farming purposes.

Proceeding north on the east side of the Kennebec we first come to Sandy river, which enters the county between Starks and Mercer, forming a line between them for three miles, when it bears to the north and courses through the eastern part of Starks, forming a union with the Kennebec at Old Point, in Norridgewock. The Sandy river rises among the mountains in the northern part of Franklin county, and therefore but a small portion of the river runs through the county of Somerset. The interval lands which it forms in Starks are rich and productive, forming some of the most valuable grass farms in the county. It is subject to sudden rises by the spring and fall rains, hence much damage is often produced by washing away the banks and sweeping off the fences. To remedy the former evil, slips of the willow are set out along the banks, which in a few years obtain so good a hold as to prevent the washing of the banks. It is a plan which might be advantageously employed in other like situations.

Sandy stream takes its rise in Pleasant Ridge, running through No. 2, 2d range, and Lexington, in a southerly course, and uniting with Gilman stream near the line between Lexington and New Portland, it proceeds southeast four miles and empties into the Seven Mile brook—sometimes called Carabassett river—at East New Portland village. This is a considerable stream of water having its rise in Franklin, and entering Somerset county in the northeastern corner of New Portland, running southeast four miles, after which it runs through the town in an irregular course, east until it intersects with Gilman stream, and then it flows southeast, dividing a part of Embden from New Portland and Anson, and

continuing through the northeastern corner of Anson, emptying its waters into the Kennebec at Savage island, opposite the village of Anson. The intervals situated upon this stream are of the same character as those upon Sandy river, than which there is no better farming land in the entire county.

We next come to Dead river, so called from the sluggish motion of its water, which in fact only applies to it above Grand Falls, for from there to the Forks it is a wild, ragged stream. It rises in the county of Franklin, and enters Somerset in Flagstaff township. This is a river of considerable size, and with its tributary streams waters a portion of the county nearly fifty miles in length east and west, and about thirty miles wide, comprising about fifty townships, a large part of the land being covered with a heavy growth of pine timber. For many years this region has been the headquarters of the lumbering operations upon the Kennebec, and there is yet no estimating the value or amount of lumber remaining upon this territory. Aside from the large quantities of pine, there are also heavy growths of cedar, together with spruce, hemlock and hackmetac, and considerable tracts of land the growth upon which is ash, oak, birch, maple, beech, &c. Minerals are found, but to what extent is not known; they comprise slate, lime, plumbago, lead and iron. There are but two townships in the Dead river valley where settlements have been made; these are Flagstaff and Dead river plantation. At the former place there are good mills, a store, &c. The soil upon the river is rich and deep, being a diluvial deposit of a chocolate color of the finest texture, and producing bountiful crops of grass, oats, wheat and potatoes—corn being seldom planted, although upon the high ridges it is said to ripen about once in four years. Large tracts of these bottom lands, every way as fertile and productive as the best farms in the Sandy river valley, can be had at a price almost nominal, the cost of clearing being about ten dollars per acre. The land on the mountains is of no value, yet lots are frequently cleared upon the sides and less lofty ridges, which produce good pasturage.

Going east from the Kennebec, the first noticeable river which we find is the Wesserrunsett, or east branch of the Kennebec. It is formed by numerous small brooks and streams in Athens, and also by Wyman pond in Brighton, and Wentworth pond in the northern part of Solon. These unite just above Athens village and form one of the most beautiful rivers in the county. It flows in a southern course through the eastern part of Cornville, and

enters Skowhegan near the center of the northern line of the town, when its course is southwest until it reaches the Kennebec opposite Bloomfield, and just above Oakes' island. This river runs over a hard gravelly bottom, and the soil upon its banks is chiefly a clayey loam. Malbon's mills, in Skowhegan, is a small village situated upon the Wesserrunsett, at which place there is a starch factory and some other mills.

Sibley pond, situated in Canaan near the northwestern corner of Pittsfield, is supplied by the waters of Morrill pond in Hartland, and Black stream, which rises in Cornville and runs in a southeast course through the north part of Canaan. This gives rise to Carrabassett river, which running in a southwest direction through Canaan, reaches the eastern line of Skowhegan, and for a distance of two miles forms the division between this town and Canaan, after which it enters Clinton in Kennebec county, connecting with the Kennebec river at Fairfield.

The Sebasticook is the only remaining river of any size which claims mention. It takes its rise in Moose pond, a large body of water lying partly in Harmony and partly in Hartland, near the west line of St. Albans. The Sebasticook runs through a corner of Hartland, then in a course southeast through the western portion Palmyra, entering the northeast corner of Pittsfield and coursing through a small part of that town, after which it forms the line between Pittsfield and Detroit, and also Pittsfield and Burnham in Kennebec county, uniting at Winslow about a mile below the village of Waterville with the Kennebec. Main stream, which is formed in Penobscot county, enters Somerset between Cambridge and Ripley, making a division of the towns, is more a succession of small ponds than a complete river. It passes through the southeast part of Harmony, empties into Moose pond, and is in fact a continuation of the Sebasticook.

This completes the list of the principal rivers in the county, which, running through it at no great distances from each other, all give their supply of water to the Kennebec, the main river of the county, and with these and its other tributaries forming an important source of wealth to the county and State. In that division of my subject relating to the more extreme northern part of the county, some account of other rivers not mentioned here will be given.

There are numerous smaller streams and brooks of considerable size, which, though not of sufficient importance to receive a sepa-

rate notice, are nevertheless worthy of some consideration. These often flow through portions of towns where the land is low and boggy, giving no employment to machinery; in others they are wild and spirited, dashing between hills and down mountain sides, the land upon their banks being broken and unfit for any purpose but pasturage. In the former case I have found such lands to be of great value in producing grasses for hay, and hesitate not in saying that they are among the most important soils of the county. By ditching, their value may be largely increased, or by simply clearing them of the bushes and mowing them, the quality of the grass will become finer and better each year.

Somerset county abounds in ponds, many of them of a large size, and all stocked with every variety of fresh water fish. In the thirty towns of the county there are twenty ponds of considerable extent, the largest being Moose pond, which lies chiefly in Hartland, being five miles long and about three wide. Embden pond, situated in the central portion of the town of Embden, contains 1,535 acres.

The surface of the county is broken and uneven, and although the northern portion is somewhat mountainous, and the central part rough and hilly, the south part of the county is gently undulating, with but very few hills of any height. The high ridges of the middle and northern towns run northeast and southwest, and the hard slate ledge with which it is underlaid approaches very near, and in many instances forms ledges and boulders above the surface. The growth upon these ridges consists of maple, beech, birch, hemlock and elm, while the swamps and low land abound with cedar, spruce, fir, ash and hackmetac.

The thirty incorporated towns consist, upon an average, of 22,000 acres each, and by the census of 1850 there were reported in the county 163,138 acres of improved land, and 235,754 of unimproved. The county embraces over two thousand square miles of territory.

Most of the farms in the county comprise one hundred acres each, although in some instances there are two or three lots in one farm. Upon some farms in many of the older towns, there is beginning to be a scarcity of timber, and in some instances buildings are erected, the frames of which were sawed from trees cut in the lumber regions of the northern part of the county, it being cheaper than the same kind of lumber cut at any place in the old towns. There are hilly pastures in these towns which are so rough

that cultivation is almost impossible, and producing but a small amount of poor herbage, which I think it would be well to re-plant with forest trees of some rapid growing variety, and thus put them into a condition where they would be of great benefit to posterity, if not to the present generation. As they are, they are each year becoming more worn out, from the continued washing down of their best soils into the valleys below, which, if they were covered with trees, would not be the case. The annual fall of leaves also goes to increase the depth, and restore the fertility of the soil. The white pine, larch, locust and white birch, are trees easily transplanted, the three former valuable for timber, and the latter for fuel, are strongly recommended for this purpose.

II.—Geology of the County.

By a resolve of the Legislature of Maine, passed March 28, 1836, the sum of five thousand dollars was appropriated, under direction of the Board of Internal Improvements, to be expended by them in carrying on a geological survey of the State. Dr. Charles T. Jackson, of Boston, was appointed State geologist, and continued his labors through the years 1836–'7–'8, but the survey was at that time discontinued on account of the heavy expenses and liabilities incurred by the State growing out of the "Aroostook war." The amount appropriated for the year 1837, was $3,000; for 1838, $5,000; and for 1839, $6,000—making together the sum of $14,000. Dr. Jackson published three reports, comprising a vast amount of valuable information, to which I am indebted for many of the notes comprised in the outline of the geology of Somerset county, which follows. Before doing this, however, a few introductory remarks are offered.

Geology, as a study, has for its aim the natural history of the earth's surface, and, with the greatest accuracy, it points out the formation of the crust of the earth to as great a depth as our means of observation extend, laying down important and interesting laws to guide our researches into the wonders of the mineral kingdom.

The character of the soils at the foot of hills, and in valleys and plains, is determined in a great measure from the composition of

the stones upon and around the higher elevations—for all soils are made up from rocks, by the various destructive operations to which they are subjected. This breaking up of rocks is effected by many stupendous processes constantly going on in nature, among which are volcanic action, floods, ice and snow. These are regarded by geologists as active agents in producing changes in the forms of rocks. They are moreover constantly acted upon by the atmosphere, rain, frost and heat, undergoing a slow but sure process of decay. Fragments are detached by frost, or some of the means before mentioned, they separate into smaller pieces and at last crumble to powder. This is moved by the winds, and washed by rains into the lower places, where, acting with the remains of vegetable and animal organizations, they constitute the soils of our valleys and plains.

There is nothing peculiar to the geological formation of Somerset county, unless it be the want of a distinguishing characteristic; and from this fact, my remarks will, of course, be brief. A large proportion of the county—especially the northern—is underlaid by a flinty slate ledge, the strata running northeast and southwest, while the southern and eastern part is underlaid by gneiss. This is a stratified rock composed of layers of quartz, mica and feldspar, while granite is an unstratified rock, composed of mixed crystals of quartz, feldspar and mica, united without cement. Therefore the soils formed by the decomposition of granite, contain the same elements as those formed by the decomposition of gneiss.

In most of the towns in the county, gneiss, or some form of granite (in boulders or ledges) is found in sufficient quantities for underpinning, walls, general building purposes, such as cellars, basements, &c. In the southwestern part of the county, in Norridgewock, there is a granite quarry on Dodlin hill, which has been in operation many years, and has proved a source of considerable income. The county jail which was built at Norridgewock in 1810, was of Dodlin granite, and also the piers and abutments of the bridge across the Kennebec at Norridgewock, and of the railroad bridge at Skowhegan. With increased facilities for transporation, the business of this quarry would soon become of more importance than ever. Quarries of granite have also been worked to some extent in Skowhegan, and at Mount Tom in Smithfield, also in Hartland.

Making an analysis of the limestone found in Norridgewock, Dr. Jackson remarks, (Report III, p. 19): "In order to ascertain how

it would behave in the kiln, I burned a large specimen, and found that it would bear a full red heat without melting in the least, and that it came out of the furnace a mass of solid and good lime, of a light brown color, slaking completely with water, and making a good strong mortar. In slaking it gains 40 per cent. weight of water, which indicates its capacity of bearing as full a proportion of sand as any lime in use." Following the suggestion of Dr. J., lime was at one time burned in this town, but as the enterprise did not prove successful, it was abandoned. For building purposes the mortar from this lime was stronger than that from any other, but the presence of considerable quantities of flint, made it necessary to strain the mortar before it was used. For agricultural uses it was valuable.

Beds of limestone are also found in most other towns in the county, but it is usually overlaid by a hard kind of porphyritic rock, which has been thrown up through the limestone, and has produced considerable distortion in the strata. The deposits most worthy of notice for their abundance, are found in Athens, Bloomfield, Harmony, Cornville, Lexington and Skowhegan. Blue limestone occurs in Bingham. Much of the soil in the county is deficient in lime, and the great benefit arising from its use is too well known by most farmers to be particularized here. It gives me pleasure, however, to present, in a condensed form, the remarks upon this topic, by Dr. Reynolds, in his very able paper upon the agriculture of Middlesex county, Mass.:* "Lime is rapidly exhausted from the soil by cultivation, when the products are removed, and especially is this the case where the principal products are fruits, grain and milk; for this reason, lime applied in any form is productive of good. Sulphate of lime, carbonate of lime, and phosphate of lime in the form of ground bones, have a marked effect upon crops, and a free use of them are needed to restore the fertility of worn out lands. Farmers very often ask the question, how much lime it is best to put upon the soil? the application of which depends in a great measure upon the condition and nature of the soil. Lime is not so much a nutritive element of plants as a means of rendering other elements in the soil soluble, and bringing them into a condition to be readily taken up by the plants and digested. Where there is insoluble humus in the soil, the lime combines with it, and renders it soluble. Thus where a

* Transactions Massachusetts Society for Promoting Agriculture. New Series, vol. 1, p. 170.

soil abounds in humus, the effects of lime are at once visible; but where this is not present, its place must be supplied by carbonaceous manures. The more humus there is in a soil, the more lime will it bear. When land has been too heavily limed, the application of manure or swamp mud will supply the remedy, and enable the lime to perform its proper office. Lime is especially efficacious in the cultivation of clover and turnips, and of almost all kinds of fruit. Lime and potash are necessary to the perfection of apples, hence a good granite or limestone soil is the best suited for apples."

Bog iron ore is extensively deposited in Anson and Skowhegan. At the latter place something was formerly done at the manufacture of iron. A large proportion of the ore was in the state of fine powder, or yellow ochre and brown oxide of iron. It was unsuitable for bar iron, being too brittle or short, but was of sufficiently good quality for ordinary purposes.

Pyritiferous slate, so rich in sulpheret of iron as to be worth working for copperas, occurs in Anson. Dr. Jackson recommended the manufacture of coperas from this rock, as a profitable branch of domestic industry, but I am not aware of its ever being undertaken.

Roofing slate is found near the Kennebec river in Moscow. The disruption seems to be in a different line from the Piscataquis county quarry, but without doubt it belongs to the same formation. No quarry has been opened, but it is thought that slate from three to six feet square could easily be split out. Slate is also found in Bingham, but of a quality not suitable for roofing purposes. It is intersected by veins of quartz, so that the strata break out in pyramidal blocks, one foot wide at the top and six feet at the bottom. Slates have been split off ten feet square and six or eight inches thick.

Considerable quantities of a species of marl, made up of carbonate of lime, argillaceous matter and silex, together with some other materials in small quantities, occurs in St. Albans. It is derived from the decomposition of argillaceous limestone, and appears in a loose, pulverized state, full of fragments of lime rock. It effervesces strongly with acids, and would form a most valuable dressing for light soils, particularly that upon which wheat is to be sown. This leads me to say, that farmers who live in districts where there are deposits of argillaceous or clayey limestone, should carefully examine the localities and see if the same species of marl may not be found in sufficient quantities for manurial purposes. It

can be tested very easily by putting it into a cup or a tumbler, and pouring on a little dilute sulphuric or nitric acid, or even strong vinegar, when, if it contains lime, it will immediately commence to foam. It may also be said in reference to some of the kilns for burning lime, formerly in operation in the county, that more study and research into the nature of the lime, would develop facts of great importance. Some who have dug and burnt the stone, and not finding it to slake very readily, or form so white and fine a powder as the Rockland and Thomaston lime, have become discouraged and abandoned the business, when, in fact, experiments as to its nature and properties would establish rules for its successful management. If lime—as is the case with that found at Norridgewock—will not answer for mortar or cement, on account of the presence of flint and slate, which prevents it forming a uniform mass if mixed with sand, it should be used for agricultural purposes, as this is of no consequence if wanted for the soil only. In my opinion it will not be many years before the Norridgewock lime is extensively burnt and used for farming operations.

Near Parlin's Pond, in No. 3, 7th range, Dr. Jackson discovered a huge bed of fine graywacke, filled with an immense number and variety of fossil shell impressions. In his third report, he says, (p. 46): "The rock is of a fine silicious variety, extremely compact where the shells do not abound, but presenting the most perfect cast of marine shells I have ever seen. The width of the bed could not be exactly determined, as it is in part concealed by the soil; but I measured it for fifty rods, which is but a small part of its width. Among the fossils I obtained the following genera, terebratulæ, spiriferæ lutrunæ and turritellæ, beside which there are several other indistinct or broken fossils, which it is more difficult to determine. From the direction of this rock it evidently crosses Moose river and the head of Moosehead lake, and extends to the banks of the Aroostook, where we discovered it last year, and from it came all these numerous boulders and erratic blocks containing fossil shells, which we find scattered so profusely over the country, from the line above mentioned, to the outer islands of the Penobscot bay, and at the mouth of the Kennebec river. The distance to which masses, six or eight inches in diameter, have been transported, is no less than one hundred and twenty-six miles in a right line, while there are immense numbers of larger size found scattered over the intervening space, and they become larger as we approach this, their parent bed."

Continuing his notice of the geology of this locality, Dr. JACKSON makes some remarks so interesting, that, notwithstanding their length, I am tempted to introduce them at this place. He writes: "No fossiliferous rock of the kind occurs in the area between this locality and the spots where are found the diluvial boulders noticed; the marks on the surface of the ledges, have long ago indicated to me that the parent bed of these fossils was to be sought inland, farther to the north than where they are found loose in the soil. We consider this discovery of the most conclusive kind, and one of great importance in the theory of diluvial transportation, both of minerals and soils. By knowing the directions from whence the scattered fragments came, we can trace rocks and minerals to their native beds, and we can predict and account for the distribution and qualities of soils, which would be wholly obscure without the above considerations. Thus, since all the diluvial soils have been moved southwardly, it is evident that the soil from one rock overlaps that of another, and so far as I have observed, the soils resting on a rock are rarely derived from its decomposition, but from those to the north. This rule indicates their treatment, for their mineral ingredients denote the amendments required. Thus persons who believed the soils of Thomaston to be the result of the decomposition of the rocks immediately below, would be apt to think that they must contain much lime, but they do not, and originated from granitic and mica slate diluvium—and experience, since we have urged the trial, demonstrates that the soil of that town needs liming to a great extent. Hundreds of other instances of this kind I have recorded, but let this suffice for the present."

At the Forks of the Kennebec river, the rocks are found to consist of argillaceous and calciferous slate, with numerous beds of fine grained graywacke. In Solon, enormous blocks of mica slate, containing staurotides and nucles occur. The rocks in New Portland are strongly charged with pyrites, which is magnetic, and causes a powerful deflection of the magnetic needle.

Beds of clay are found in various parts of the county, and brick-making is carried on to a limited extent in most of the towns. There being but little foreign demand, and but a small home consumption, the business is confind to a local sphere, each town manufacturing enough to supply its own market.

A ledge of rocks, containing a large proportion of carbonate of lime and green calciferous slate, occurs near the Forks of the Kennebec, which, on account of the fineness of the grit, has been

extensively used for whet-stones, and answers a good purpose. Slabs nine feet square and one foot thick have been split out with great ease.

A classification of the soils of the county admits of this general division: upland, sandy plain, low meadow, and interval. With a few words upon the character and composition of these soils, I shall conclude my remarks upon the geology of Somerset county.

1st. The rocky upland soil comprises by far the largest proportion of the tillage land in the county. This upland has all the elements of a good soil, but the loam is coarse, and the particles only partly fitted for the proper growth of plants. Hence, much labor is necessary to completely pulverize the soil, and obtain a thorough tilth. It is well fitted for grass culture and pasturage, and also adapted for orcharding, barley and corn growing. In many localities the soil is nearly three feet deep, and could be worked to that depth, if necessary, with the aid of improved implements. In some places, however, the soil is very shoal, rocky and only adapted for pasturage. Considerable quantities of wheat are now grown on soils of this character, although the crop is not generally cultivated.

2d. Sandy soils, or plains, are those which contain from seventy to ninety per cent. of sand. They are known by their small degree of adhesiveness, and open, porous character. No extensive tract of sandy plain, which is cultivated, occurs in the county, they usually appearing in situations of small extent between hills and upon high banks of rivers and streams. Land of this class is found in Madison, Skowhegan, Norridgewock, Solon, Canaan, Anson, and New Portland. In some locations the growth upon this soil is pine; and in others, white or grey birch, and poplar. These plains are generally considered inferior to other soils, but with the aid of manures and consolidating substances, they produce good crops of corn, potatoes and grains, and no land pays better for improvements. They require frequent dressing, and often going over, and can be worked earlier in the season than most other soils. It needs more skill and practical experience on the part of the operator to manage a sandy farm profitably, than an interval one, for the course of cultivation requires frequent change, and the plans must be laid deep and reaching far into the future. The system of liquid manuring is found to succeed well on soils of this description. The permanent improvement of sandy soils consists in the addition of clay, marl and muck, wherever they can be ob-

tained at an outlay consistent with the benefit they are likely to produce.

3d. The low meadow lands which are found to a greater or less extent upon most farms in the county, are often of more value than any other part of the farm, but their profit and usefulness depend upon the degree of improvement and cultivation under which they are managed. At present, there are thousands of acres of such lands in the county that are neglected by the farmers and considered almost worthless, which, if they were cleared of the bushes and logs, and properly drained or ditched, would at once become the best paying fields upon their farms. To reclaim these low and boggy meadows is a work in which all farmers having such lands should at once engage. In many cases the cost of doing this is not heavy, while the increased value of the land and its productive returns will more than pay the cost of improvement in a single year. More will be said upon the management of wet meadow lands in the division on grass culture.

4th. The fourth class comprises the interval lands, which embrace the richest, most fertile and productive soils found in the county. The Kennebec river, which runs directly through it, together with the Sandy and Dead rivers, and the other large streams in different parts of the county—particularly the Seven Mile brook and the Wesserrunsett—form some of the most valuable land, and comprising the best farms in the county. In many places the intervals are so low that they are overflowed by the heavy autumn rains, which deposit upon them a sediment of mineral and vegetable substances in a state of solution, and forming a rich dressing of materials washed from the mountain sides and upland farms; and in other situations, the intervals are so high as not to be overflowed, and these must be manured by artificial means. Both classes of intervals are highly productive; the only difference being in one case they are manured without labor, in the other farmers must apply dressing. These lands are excellent for grass, and the higher intervals good for tillage.

III.—Meteorology.

The science of meteorology is closely allied to agriculture, relating, as it does, to those forces in nature which contribute to the growth and perfection of the vegetable productions of the earth. Light, heat, atmospheric air, electricity, rain, snow, frost and dew, each have an influence upon the growth of all cultivated plants. Therefore, an acquaintance with the laws of nature by which these agencies are controlled, furnishes a direct aid to the husbandman, and no study is more useful or interesting. Dr. Reynolds, in his able report on the agriculture of Middlesex county, before alluded to, makes the following remarks in his introduction to that branch of the subject now under consideration:

"As all plants are made up chiefly of elements previously existing in the atmosphere, its composition and the changes which occur among its elements, cannot fail to be an interesting and important study. The atmosphere is composed of nitrogen, oxygen, water in the form of vapor, carbonic acid, and a minute amount of ammonia, and nitric acid. When a plant is exposed to the free action of the atmosphere and the rays of the sun, it is found to increase in size and weight. This increase is owing to the carbon which the plant receives from the atmosphere. Carbon, in the form of carbonic acid, or carbon united with oxygen, is absorbed by the leaves and green coverings of the growing branches, and in their vessels is decomposed by the power of the sun's rays. The carbon is appropriated to its own use by the plant, and the oxygen is thrown off into the atmosphere. The rays of the sun produce at least three distinct effects, or communicate three distinct impulses, viz: the lighting, the heating, and the chemical impulse. It is the latter impulse that causes the decomposition of the carbonic acid in the vessels of plants. But in order that this impulse may produce its full effect, the heating impulse must be present also; and to render the plant capable of being acted upon, moisture must be contained in the air. By a proper understanding of these facts, we are able to produce an artificial climate that may enable us to repeat in a northern zone the growths of the tropics."

The soil and climate of a country have considerable influence upon its agricultural capacities, and there are also several other

causes which have an effect upon its productiveness. Its latitude, or distance from the equator on either side; its situation, whether in the interior of a continent, or upon the seaboard; by the configuration of its surface, as regards elevation or depression; by the direction and force of the prevailing winds; by the nature of the soil and the manner of cultivation.

It is evident that the atmosphere of countries situated upon or near the ocean, is affected by the alternation of inland and sea-breezes, brought on by the differences in the absorption and radiation of heat, by the surfaces of the land and water. The warm waters of the tropics, which are carried to the north by the ocean currents; and the rushing back of the cold waters from the north to supply their place, cause a modification in the temperature near the sea coast.

There is a vast difference in the power of soils to absorb and give off the heat received from the sun: they also differ in their capacity to absorb and hold the moisture which they receive in the shape of rain and dew; hence the geological formation, and state of culture, influence the climate of a country to a considerable degree.

The temperature of Somerset county is somewhat affected by the high ranges of hills upon its northern boundary. These retain the snow late in spring, and as the prevailing winds are north-west, they blow the whole length of the county with much severity, even after the snow in the southern part has for a long time been gone. Snow falls earlier in the winter, and remains upon the ground later by some weeks in the northern part of the county; the land in the southern part can be worked, and seed planted several days in advance of the more northern towns. Observations made in the interior of the county, for a number of years, show the average time of the apple trees in full blossom, to be May 25th to 28th. In very early seasons they are out as soon as May 22d, and in late ones not until June 6th.

In this place I give the following tables upon the progress of vegetation, kept by an observing and intelligent cultivator in the central portion of the county. It may also be remarked that tables of this character, kept for a series of years, would determine to a very exact calculation when ground is in a state of proper warmth to receive the seeds of annual plants, and also to judge from the time of planting the seeds of perennial rooted plants when they may be reasonably expected to be sufficiently ripe for

eating. Mr. JAMES WINTHROP, in communicating tables of this description to the "Transactions of the Massachusetts Society for Promoting Agriculture," for the year 1803, remarks that by these means, prosecuted for many years in succession, he hopes to see "agriculture as much a subject of calculation as astronomy is at present."

TABLE I—*Of First open Leaves. Average for eight years.*

Apple,	May 8.	Cherry, wild,	May 10.	Lilac,	April 27.
Ash, brown,	" 25.	Currant,	" 9.	Larch,	May 5.
Alder,	" 6.	Elm,	" 7.	Maple,	" 6.
Beech,	" 10.	Gooseberry,	" 9.	Poplar, black,	" 7.
Birch, white,	" 11.	Hardhack,	" 7.	" white,	" 15.
" yellow,	" 12.	Horseplum,	" 10.	Rose,	" 9.
Balm of Gilead,	" 8.				

TABLE II—*Of the growth of Indian Corn, and the number of days from planting, for each period of growth. Average for six years.*

Planted.	Sprouted.	Tasseled.	Silked.	Eatable green.
May 19.	May 31.	July 17.	July 20.	August 23.

No record of the temperature in winter and summer, and of the fall of rain and snow have ever been kept in the county, and I am obliged to present weather tables from situations where the climate and temperature does not differ much from that in the county of Somerset. The first table presents the temperature of the last 22 winters, from 1836 to 1858, from observations made at Gardiner, in Kennebec county, latitude 44 deg. 12 min. north, longitude 69 deg. 46 min. west, by Hon. R. H. GARDINER:

Years.	Mean heat, four winter months.	Nights below zero.	Greatest cold.	Am't snow during wint.	Days good sleighing.
				ft. in.	
1836–7.	20.933	30	—27		91
1837–8.	23.075	11	—23 1-2	2 6 2-3	
1838–9.	21.442	31	—23 1-2	5 11 1-2	51
1839–40.	25.300	19	—23	5 2 1-10	16
1840–1.	24.273	18	—19	10 3 1-10	76
1841–2.	27.760	10	—18	4 8	16
1842–3.	21.108	19	—20	12 1 3-4	114
1843–4.	20.008	26	—30 1-2	8 3 1-2	92
1844–5.	22.598	17	—12	9 8 1-3	80
1845–6.	21.569	24	—14	5 2 1-2	109
1846–7.	23.677	14	—19	6 7 3-4	100
1847–8.	24.851	15	—15	6 3	38
1848–9.	22.151	33	—25	5 11 3-8	77
1849–50.	24.582	14	—25	8	91
1850–1.	23.424	18	—14	7 2	111
1851–2.	21.836	28	—18	9 2	126

WEATHER TABLE, (*Continued.*)

Years.	Mean heat, four winter months.	Nights below zero.	Greatest cold.	Am't snow during wint.	Days good sleighing.
1852-3.	25.480	9	—22	6 9 1-4	81
1853-4.	19.675	27	—25	10 2 1-4	110
1854-5.	22.123	24	—27	4 5 1-3	60
1855-6.	19.698	59	—26	5 2	112
1856-7.	22.535	27	—40	6 10 1-4	68
1857-8.	22.350	9	—24	4 7 1-2	47
Means.	23.793	22 1-11	—22 3-10	6 5 6-7	79 1-3

NOTE.—March is usually called a spring month, but in Kennebec it has no pretentions to be such; and in this table is included in the four winter months. It will be seen that the winter of 1841-2 was the warmest, and those of 1853-4 and 1855-6 the coldest within the years comprised in the report.

MEAN TEMPERATURE *of each month, for the year* 1858; *from observations made at Gardiner, Maine: by Hon. R. H. Gardiner.*

Jan.	Feb.	March.	April.	May.	June.	July.	Aug.
21.923	15.217	27.692	40.073	50.992	64.069	65.900	63.939

MEAN TEMPERATURE, &c., (*Continued.*)

Sept.	Oct.	Nov.	Dec.	Average.	Greatest heat.	Greatest cold.
58.992	47.780	31.213	16.4288	41.5027	87	—32

AMOUNT OF RAIN, *registered at Waterville College, Waterville, Maine, for each month, from* 1850 *to* 1853, *inclusive.*

NOTE.—It will be seen from the following table, that the mean annual values for 1850, 1851 and 1853, are very nearly alike, and differ materially from that of 1852; but the likeness is accidental. It is not true in regard to the *moisture*, as it is in regard to the *temperature* of a place—and all accurate published observations will show it—that the mean value for any *one* year, differs, by a very small quantity, from the mean value of a series of years, great or small in number.

Months.	1850.	1851.	1852.	1853.
January, .	2.44	2.53	1.76	1.31
February, .	2.48	3.30	2.23	6.38
March, .	1.54	1.08	2.85	2.07
April, . .	1.33	4.60	4.52	1.97
May, . .	9.60	2.41	0.00	4.77
June, . .	5.20	1.50	3.32	2.20
July, . .	3.84	7.27	3.57	4.40
August, .	5.68	2.20	5.87	3.01
September, .	3.05	2.41	2.49	4.48
October, .	4.97	8.41	3.45	4.77
November, .	1.58	5.46	4.73	5.47
December, .	2.53	2.87	4.36	3.39
	44.24	44.04	39.15	44.22

Mean moisture for four years, 42.91.

TABLE *of the Opening and Closing of the Kennebec River, at Gardiner, Maine, from* 1785 *to* 1860; *according to the records of Gen. Henry Dearborn, Major William Swan, and Hon. R. H. Gardiner.*

Year.	Opening.	Closing.	Remarks.
1785.	April 24.		
1786.	March 21.	November 18.	
1787.	April 7.		
1789.	" 4.	January 5, 1790.	
1791.	" 3.	December 10.	
1792.	" 3.	Nov. 23, Dec. 10.	Opened after first closing.
1793.	" 1.		
1794.	" 6.	January 4, 1795.	River opened to within two miles of
1796.	"	November 28.	Nehumkeag.
1797.	" 4.	" 22.	
1798.	" 12.	" 23.	
1799.	" 13.	" 24.	
1800.	" 10.	Nov. 28, & Jan. 2, 1801.	Opened December 13—plowing at
1801.	March 28.	December 10.	Christmas.
1802.	April 9.	" 16.	
1803.	March 22.	Nov. 16, Dec. 22.	Vessels come up to Gardiner, Dec.
1804.	April 12.	November 19.	2—whole river opened Dec. 13,
1805.	" 2.	January, 1806.	and closed Dec. 22.
1806.	March 15.		
1807.	April 7.	December 18.	
1808.	March 29.	" 6.	Vessels come up to Gardiner March
1809.	April 17.	November 23.	27.
1810.	" 9.	December 9.	
1811.	March 24.	" 14.	
1812.	April 18.	" 10.	
1813.	" 11.	" 13, 21.	Vessels come up to Gardiner Dec.
1814.	" 6.	December 4.	15.
1815.	" 18.	" 2.	
1816.	" 20.	November 29.	Vessels come up to Gardiner April 17.
1817.	" 17.	Nov. 25 and Dec. 7.	River broke up from Gardiner, Nov. 30. Vessels come up to Gardiner Dec. 3. Whole river broke up Dec. 7, and closed same day.
1818.	" 12.	December 4 and 10.	River broke up Dec. 6, and closed
1819.	" 14.	" 5.	Dec. 10.
1820.	" 15.	Nov. 16 and 29.	River opened Nov. 17, from Gard-
1821.	" 11.	December 1.	iner. November 20, whole river
1822.	March 29.	" 6.	opened.
1823.	April 11.	November 16.	
1824.	March 28.	Dec. 1 and 9.	Opened Dec. 3.
1825.	April 5.	Nov. 23 and Dec. 12.	Opened Nov. 28.
1826.	" 2.	Dec. 4 and 20.	Opened Dec. 10.
1827.	March 29.	Nov. 24 and Dec. 6.	Opened Nov. 30.
1828.	" 25.	December 3.	Vessels come to Gardiner Mar. 23.
1829.	April 12.	" 3.	
1830.	" 1.	Dec. 13, 19, Jan. 11, '31.	Opened Dec. 25 and 27. Two ves-
1831.	March 30.	December 2.	sels arrived from Boston, Jan. 1.
1832.	April 14.	" 2.	
1833.	" 5.	" 14.	
1834.	" 3.	" 8.	
1835.		November 23.	
1836.	" 9.	" 27.	
1837.	" 14.	" 27.	
1838.	" 3.	" 24.	Very great winter freshet, Jan. 28,
1839.	" 6.	December 18.	1839.
1840.	March 31.	November 28.	

TABLE OF OPENING AND CLOSING OF KENNEBEC RIVER, (*Continued.*)

Year.	Opening.	Closing.	Remarks.
1841.	April 5.	Dec. 1, 7 and 17.	Opened Dec. 4 and 11. Vessels come up to Gardiner, March 18.
1842.	March 20.	November 28.	
1843.	April 19.	" 30.	
1844.	" 9.	" 27.	
1845.	March 31.	December 7.	
1846.	" 28.	" 2.	
1847.	April 20.	" 21.	
1848.	" 1.	" 22.	
1849.	March 30.	" 8.	
1850.	April 3.	" 8.	
1851.	" 6.	" 1.	
1852.	" 12.	" 16.	
1853.	March 29.	Nov. 27, and Dec. 4.	River opened Nov. 30.
1854.	April 21.	December 3.	
1855.	" 9.	Nov. 23, and Dec. 11.	Opened Dec. 10, and vessels come up.
1856.	" 9.	December 1.	
1857.	" 5.	" 5.	
1858.	" 3.	November 30.	
1859.	March 30.	December 4.	
1860.	" 31.		

From this record it will be observed that the river opened nineteen years in March, and fifty-two years in April; and that the first closing was 27 years in November, and 37 years in December. The mean opening is April 6th, and the mean first closing December 2d. The earliest closing is November 10th, and the earliest opening March 15th. The latest opening was April 24th, 1785, and the next latest April 21st, 1854.

The amount of Rain and Snow melted, as registered at Gardiner, by Hon. R. H. Gardiner. Average of Observations for twenty two years.

Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
3.3763	3.0771	3.4341	3.3624	4.1361	3.5343	3.3283	4.0429	3.0869	4.4183	4.3001	3.6728

IV.—Agricultural Productions of the County.

The farmers of Somerset county pursue a mixed course of husbandry. It cannot be said that any particular branch receives special attention at their hands. Corn is grown to a greater extent than any other crop, and it is as reliable a one as can be cultivated. It is true, that the season has some influence upon it, and if the ground is prepared in the most complete manner, the crop may prove a failure; but as a general rule, it is safe and reliable. Grain crops, with the exception of wheat, are cultivated to a considerable extent. Although in previous years the wheat midge has caused much destruction and farmers abandoned the growing of wheat, yet, at present, more attention is bestowed upon it, and not wholly without success. Its general culture may once more become one of the prominent features of our agriculture.

Stock husbandry, in the different branches of horses, sheep and neat stock, forms the leading business of a large proportion of the farmers of the county. In each of these departments, a decided improvement has been going on during past years. To increase the size of a four years old ox from six to seven feet in girth, at the same time making corresponding improvement in his form and working capacity, also adding to his market value more than one-half his original worth—and this, the work of twenty years, is no inconsiderable matter. I think farmers have neglected the rearing and improvement of the breeds of milch cows, as much as any part of stock husbandry. Cows are too often left to take care of themselves, while a favorite yoke of oxen receives extra care, when in fact, no stock gives a better return for good keeping, than milch cows. The breed most common in the county is grade short-horn.

The working oxen seen upon most farms, and also found in the lumber regions of the northern part of the county, consist of the most choice specimens of stock; and for beauty of form and color, large size and good working qualities, cannot be excelled in any section of the State. They are usually purchased of farmers, in the fall, for the business of lumbering, and after being worked in the swamp two years, are fattened for beef. The work upon farms is chiefly performed by ox labor, as it is proved to be better, cheaper and safer.

Somerset county is well adapted for sheep husbandry, but this

branch of farming has been much neglected. A mania for keeping horses has been raging for several years past, and this has caused the interest of sheep raising to be put in a lower grade, or entirely overlooked. When farmers of the county become fully acquainted with their best interests, they will rid themselves of this surplus of horses and give more prominence to sheep culture. They are a more valuable stock for restoring pasture lands to their original fertility, than any other; and the raising of wool, as well as mutton, may of itself be made the best paying branch of farm management. For wool, the Spanish Merino stands in the highest esteem by those who have given particular attention to sheep husbandry. Some interest is now being manifested in rearing coarse-wooled breeds.

The productions of the dairy, although mostly consumed within our own limits, are, nevertheless, items of considerable importance. There are no farms especially devoted to the making of butter and cheese, yet each farmer keeps from one to six cows; the proceeds of which find a ready sale at remunerative prices, chiefly at villages within the limits of the county.

Some attention is also given to the culture of roots, and to the manufacture of sugar and molasses from the sap of the sugar maple. Both of these productions demand more notice and care from our farmers.

With this introductory notice, I proceed to give more extended remarks in relation to the chief agricultural staples of the county.

1.—*Grass Culture.*

In a district where stock growing forms the leading branch of farming, the culture of the grasses assumes an importance not known or thought of in localities chiefly devoted to fruit growing and other pursuits. Grass constitutes the principal food of our domestic animals, with the exception of swine—it feeds our working animals and is the raw material from which is produced our butter, cheese, wool, beef, and mutton; and by furnishing a support for our farm stock, produces in an essential degree the elements for the growth of our vegetables, fruits and breadstuffs. In treating this part of my subject, I divide the topic into three points:

1st. Mowing land, or grass periodically cultivated as a rotation crop.

2d. Permanent meadows.

3d. Pasture.

I. In no branch of the husbandry of the county is a greater reform needed than in the cultivation and management of grass lands. This reform is called for in several particulars. *First*, in the preparation of land to be seeded. Upon many of the older farms the prevailing practice has been to plow up sward land and plant with potatoes, applying no dressing, then to plant with corn, putting on the scanty amount of manure made from a small stock of cattle, after which the land is sowed to barley or oats, and seeded down. In some cases a fair catch of grass is obtained, if the season is favorable, but the land soon runs out and produces but a small amount of forage. If mowed for several years, as is usual before it is again plowed up, the yield decreases each year, and at length will not pay for going over. Sometimes it is pastured for a few years before being plowed. By this practice, it will be seen at once, that the last possible amount of nourishment is drawn from the soil before the grass seed is put on; hence the importance of having the land thoroughly tilled and well prepared by a judicious and liberal system of manuring before seeding to grass. If this is not done, the product of the field will be greatly lessened. To obtain a fine tilth, and leave the surface of the ground as smooth as possible, either by means of the roller or brush harrow, is also a matter of no small consequence.

Second, the amount of seed per acre. The universal rule among farmers of the county has been, a peck of timothy (herds-grass,) and ten pounds of clover to the acre. Upon rich, moist land, this amount may be sufficient, but as a general thing, land is too lightly seeded. There is a great difference in the yield of a field seeded sparingly, and one in which a liberal supply of seed has been put on. If there is not a sufficient amount of grass seed sown, the land is liable to come in with weeds, and the grass will suffer more from drouth, and also be more apt to winter kill. In some parts of the county considerable quantities of grass seed are raised and prepared for market, and farmers do not generally produce their own seed. Where the seed is bought at prices rather high, they are liable to think a smaller quantity per acre will do, than what is absolutely necessary, and hence the reason of a light seeding. Farmers should all raise their own seed; they can then rely upon its being new and pure, and make a heavier application to their land.

Spring seeding is the practice followed to a great extent. When wheat was cultivated more generally than for many years past, it

was employed as a crop to seed with, but now barley and oats are sown. With oats, the catch is not so sure, particularly if a thick and heavy growth of straw is obtained, or if they lodge badly; in which case the grass is apt to die out on those places where the oats lodge upon the ground. If, however, seeding must be done with oats, it is best to put on but a small quantity of seed, (say three bushels,) to the acre. Seeding in the fall, or rather during the months of August or September, has not been much in use, but it has some advantages. Especially so, if the land is in a rough state in the spring and cannot be made smooth enough for mowing. In August it can be worked to advantage, brought into a suitable condition for laying down, and the surface left smooth and even. The rains of September will bring up the seeds, and it will get well rooted and make a good growth before the setting in of winter. The season following, a fine crop of hay may be taken off, which will be rather later than that seeded in the spring, but this will only make the work of haying more advantageously accomplished. If moist or clayey lands are seeded in autumn, they are more liable to be thrown out by the frost during the winter, and upon such lands it is a good plan to go over them with a heavy roller in the spring. This operation not only presses the roots into the soil, which would soon dry up, but it levels the ground for the better performance of haying.

The top-dressing of grass lands is but little practised. Among some of the farmers it is beginning to receive more notice, but is not yet a general custom. Ashes are a most valuable dressing for applying to grass, and are found to keep it in a luxuriant state. Liquid manure, if it could be preserved and applied in a convenient manner, would form an active, ready and efficient dressing. At present, if the liquid voidings of stock is not allowed to run to waste, it is thrown into the cellar or shed with the solid portion. In making use of any manure for top-dressing, the best time for its application is doubtless in the spring, when the grass is just starting; but a farm team in performing the operation would badly cut up and injure the land, leaving it in a rough state for mowing. To obviate this difficulty the manure is carted on in the fall, and consequently loses much of its value. It is a fact which the farmers of the county should never lose sight of, that a large proportion of their grass lands may be kept in a fertile condition, and at far less cost, by means of top-dressing than by any other method.

It has long been an established rule to commence cutting grass

the fourth of July. This perhaps would be early enough if grass could all be cut just at the time when it would furnish the most and best fodder, but I think nothing is lost by commencing even before this time. I have heard many farmers say they did not begin haying soon enough, but never one who thought he began too early. For if some grass is not really fit to cut as soon as the time above mentioned, yet allowing for dull weather, &c., during the hay season, much of the grass will get considerably dead before the scythe reaches it. And here I wish to refer to a common error in practice with those farmers who have both English or upland and also low meadow grass to cut. It is in cutting their finer grasses first, and allowing the meadows and coarser grasses to remain uncut until quite late in the season. The fact is, low meadow grass should be mowed first, for, according to an eminent agricultural writer, they deteriorate in nutrition much more when left to ripen their seeds, than the finer varieties of grasses.

There are few farmers in the county but what admit the injurious effects of pasturing mowing fields in fall, and yet it is the prevailing practice, but allowed because it is said to be necessary. The feed in pastures becomes scanty by August or September, and as the fall feed of mowing lands has received a fresh start, the cattle are turned in. Some do not regard it as very injurious to feed moderately, but to crop close is without doubt a plan which should never be adopted. Aside from many prevailing opinions on both sides, the argument seems to be in favor of not feeding the after growth. If this is done, the spring growth is retarded, and lacks vigor.

Within a few years improved implements have been introduced to some degree. It has been estimated that fifty mowing machines were put in operation in the county the past season. Those who use mowing machines are able to perform their work in good weather, and to cut at the time when the grass is in its best state for making nutritious fodder. Some farmers who own machines cut grass for their neighbors, charging therefor fifty cents per acre. As a general thing it is the one-horse mowers which are most commonly used. I would here make a suggestion, that those who use a one-horse mower, should have two cutting bars—one a short one, the other longer. In cutting light and thin grass the longer bar could be used, and the same power would go over more ground; while if the grass was heavy the shorter one could be put on the machine in a moment's time.

Hay caps are coming into general use, and their advantage is beyond question. They protect large quantities of hay from rain, and also hasten the process of making. They are also highly useful to keep the heavy dews from partially made hay.

In 1850 the number of tuns of hay reported was 66,183. This, at eight dollars per tun, a fair estimate, would be $529,464. The many severely dry seasons experienced during the past ten years, have had much to do with lessening the hay crop of the county, and probably the value of this crop for the present year will not much exceed the above estimate.

II. By permanent meadows, I mean intervals and low grounds, which produce grass every year without being plowed or seeded. This sub-division also calls for remarks under two heads. 1—Low meadows. There is scarcely a farm in the county which has not upon some part of it a brook or stream, larger or smaller, the land upon which is second only to river interval for producing grass. In many instances these are not yet cleared of their bushes and weeds, yet where the same class of land has been cleared, it yields a wonderful return of good quality of hay. These meadows are naturally adapted for the growth of grass, and have only to be cleared of their first growth before they come immediately into a bearing state. It is also advisable on those places where brush has been burned off, to sow a mixture of timothy and redtop seed, which, in connection with the natural grasses, produces an excellent forage for sheep and neat stock. In most cases the herbage of these low meadows is coarser and less nutritious than that of those which lie higher; and therefore interval or upland hay is preferable as a food for cattle. These meadows would be much improved by drainage or ditching, and the quality of hay would be finer, but it is better to have them cleared up and produce only natural herbage, than to have them remain in an unimproved condition. Large portions of the very best grass lands in the county are of this class, and are yet unreclaimed, when by bringing them into a suitable state to yield grass, particularly by draining those excessively wet, the hay crop of the county may be doubled in a few years, and that, too, without diminishing other crops. 2—Intervals, or rich bottom lands, produce the best grass of any land in the county. They are perhaps not more natural for grass than lower meadows, but it is of a much finer quality. Usually situated so low as to be flooded each year, they keep up their natural fertility without the aid of artificial dressing for years in succession.

I know of extensive intervals in the county, which, with an annual irrigation, yield from two to three tuns of hay per acre each year, and this hay is sold off, and no return whatever made to the land; yet it produces as large crops of as excellent quality of hay now as it did fifty years ago. Even if the crops are not sold from the interval, see what a source of wealth it must be to that farmer who possesses it. It demands no manure, and the dressing from stock kept upon it can all be applied to higher portions of the farm, which need constant returns for the crops taken therefrom. It is a matter of much importance to prevent the deterioration of intervals situated so high that they cannot be flowed by the river upon which they are situated. On such lands the better grasses are apt to run out and their place superseded by those of an inferior quality, or by moss and noxious weeds. The finer grasses flourish best in *moist* soils, but a wet one is destructive to them. Hence, the first step towards improvement is to drain or ditch in order to keep the surface free from water. Harrowing in early fall is found beneficial to meadows, and affords a good opportunity to sow new seed, and thus have a succession of young plants. Lime and ashes form an excellent top-dressing for this kind of land. In many cases the annual application of a bushel of plaster per acre, is made with good results.

III. The renovation of our worn out pastures is a subject in which every farmer in the county should be interested; for pasture land, like that which is tilled, will not continue unimpaired in fertility for a series of years, unless something is put on to supply the deficiency of that which is constantly carried away. There are in the county many hundreds of acres that have been used as pastures ever since they were first cleared, and which formerly produced good feed, but are now growing up to scrubby bushes, being covered with mosses, and yield but a scanty supply of inferior pasturage. It is often the case that these lands are so rocky and broken as to be unfit for plowing, or so remote from the farm buildings as to be incapable of tillage.

It will be seen at once that the method of restoration will depend much upon the character of the land. If it is full of stagnant water, which will consequently check the growth of the better sorts of grasses, and produce wild plants and coarse water grasses, it will require drainage, if this can be done without too great an expense. If the land admits of working, it can be plowed, manured and re-seeded; if not, a top-dressing of plaster, leached

or unleached ashes, bone dust or superphosphate of lime may be applied. If, on the other hand, the pasture naturally produces good grass, but not of sufficient quantity to keep the stock in a thriving state, it should be carefully trimmed of the bushes and pastured by sheep, or, especially not crowded with any kind of stock. In this, I have the eminent THAER for my authority, who says in his Principles of Agriculture, that, when too great a number of cattle are allowed in one pasture, vegetation is choked, the grass has not time to reach its full growth, the tops are bitten off by the cattle and often torn up by the roots.

Sheep are kept in considerable numbers by the farmers of the county, but not half the number that might be. They are well fitted to renovate our worn out pastures, and it is an established fact that land grazed by sheep constantly improves in fertility. Sheep are liable to be killed by dogs, and also require a much closer, and therefore more expensive fence than any other stock, which are two objections against the use of sheep for the purpose of improving pastures. It may not be inappropriate to give in this place, the statements of an experienced farmer of Massachusetts, as given by SANFORD HOWARD, editor of the "Boston Cultivator:" "In a late conversation with a gentleman, he mentioned a plan which he had in view for improving a rough pasture lying at a distance from his homestead. He said he intended to put on so many sheep that they would eat everything that was eatable on the land, and should give them oil-cake enough to fatten them. Thus he would have the wild vegetation killed and the land made rich by the oil-cake manure, which would insure a good growth of the right kind of herbage. The idea strikes us favorably—we cannot see why something like this may not be done extensively. It might be well to confine the sheep at night by hurdles on the spots which most need manure—shifting from place to place, as the requisite dressing had been applied."

A large proportion of the land devoted to pasturage in the county is high and rocky, thus, with good treatment, well calculated for grazing. But much of the value of pasture land will be found to consist, not only in its improvement by some of the methods just alluded to, but in the skill and judgment of the farmer in stocking his pasture to advantage. He should be acquainted with every division of it, and so stock it that the herbage may not grow faster than it can be eaten by the sheep or cattle, and that the animals may always have the amount needed. Each animal re-

quires a certain quantity of food to make up for the daily waste occasioned by the animal functions. If he has no more than this, he does not progress—the more he can convert into fat and flesh beyond this required amount, in a stated period, the more profitable he will be. In the same pasture one creature will give a reasonable profit, while another may cause an actual loss. Thus, the adaptation of the stock to the nature of the pasture is an object of the greatest importance and one that calls for much experience and judgment.

It is a general custom to pasture horses, cattle and sheep together in the same lot, where a farmer makes no speciality of devoting his farm to a particular branch of stock raising. If sheep are more largely kept in certain districts, they are pastured separately; but if only a small flock, they run with the other farm stock. It has been regarded as advantageous to the pasture, and also to the thrift of the stock, to allow all kinds to graze together, thus keeping it well fed; for one animal will eat the grass refused by another, and all will then be kept in good condition, (if the pasture be not overstocked,) and no superfluous vegetation can grow. The plan of changing cattle from one pasture to another, at successive periods, has much to recommend it over that of suffering them to range upon the whole extent of pasture land; but it has not been practised, as I am aware, in a single instance by any farmer in the county.

I think this subject is one neglected alike by farmers themselves and by County Agricultural Societies. If liberal premiums were offered by them for the best managed experiments in renovating exhausted pasture lands, much good would undoubtedly grow out of it. It is an object which should receive their attention.

2.—*Indian Corn.*

This is the most important crop raised in the county, and its production is increasing, owing, in part, to the fact that wheat is not generally cultivated, and farmers must depend upon this staple as a substitute, and also as a crop to exchange for flour. At the present time, the value of the corn raised in the county, is estimated at $200,000 per year. With the aid of improved implements of culture and a higher system of manuring, the average amount per acre has largely increased during the past twenty years, but even now it cannot be estimated at more than twelve bushels to the acre, although in some instances, thirty and even fifty bush-

els are obtained. Except in some of the more northern portions of the county, corn is universally grown, and is the favorite crop.

In the management and preparation of this crop, as with others, each farmer pursues his own way, and carries out his peculiar notions. Therefore, no generally adopted system or plan can be given, as showing the usual method of culture. Many farmers consider it unsafe to plant upon sward ground, and hence break up, plant with potatoes, and then with corn. The cut-worm is more liable to injure corn planted upon sward ground, especially that plowed in the spring, and for this reason potatoes are first planted. Other farmers, again, plant upon sward land, and that too, plowed in spring. Some plow under about two-thirds of the dressing and apply the other third in the hill; while others secure better results to spread the manure on the sward, plow it under, harrow and furrow the surface and put in guano, ashes or plaster in the hill. The first mentioned way, is, perhaps, more commonly practised; as by it, the corn gets an early start, and by the time the roots penetrate to that portion of the manure plowed under, the growth is vigorous during the later as well as the former part of the season. July and August are the months in which corn makes its most effectual progress, and it is not only necessary that it should have a good start in early spring, but have something also to furnish it with strength to perfect its growth and maturity. The sunny days and warm nights of these months, work wonders for the corn crop.

The varieties grown are the Canada and Dutton; a mixture of these two sorts, and the King Philip to a limited extent. It is not early enough for our climate, except in situations upon high elevations where frosts do not occur until the last of September. The Canada does not yield so heavily, but it is earlier, and therefore a much safer variety. The time of planting varies with the particular location. In some places from the 15th to the 25th of May; in others about the first of June.

The often severe drouths of summer causes a check in the growth of corn. Deep plowing, and planting as early as practicable, that the corn may obtain a good hold of roots before the coming on of dry weather, and frequent working of the soil, are suggested as remedies against the injurious effects of summer drouths. Upon this topic, a recent author says: "Stiring the soil with the cultivator, or the hoe, in a dry time, when the corn is parched, will cause the rolled up leaves to expand and assume a fresher and more health-

ful hue. The more intense the drouth, the more dilligently should the ground be stirred."

In some sections of the county, corn is frequently injured by early frosts. There are two ways in which the evil may be partially obviated. First, in selecting the corn for seed. It is well known that corn grown in the northern limits of our country, is dwarfed in growth, and of early maturity. Hence, every degree of latitude south from our high limits, shows a larger growth and later perfection. Corn grown in New Hampshire and planted as far south as Maryland, will ripen several weeks earlier than varieties originally raised there. This statement is only a comparative suggestion. Corn grown in Bingham, and carried into the south part of the county has been found to come to maturity a week earlier than the kinds raised there for a number of years. And if farmers upon low situations in the southern towns of the county, would make some effort to obtain seed corn from Moscow or Bingham once in four or five years, the result would be a variety of corn which would ripen several days earlier than that grown in their own vicinity. But if this is not practicable each farmer can do much to make his corn ripen earlier, by gathering the most forward ears from the field before the corn is harvested, to plant the succeeding year.

Second, care and judgment in securing the corn is important. Some farmers believe that as long as the stalk remains green, the corn should stand; the ear gaining more in weight than is lost on the fodder. The proper way, however, is to cut up the corn as soon as the kernel is glazed or becomes somewhat hardened, bind into small bundles, and cure in shocks. If cured in this manner, the fodder is of excellent quality and flavor. Some practice cutting the tops for fodder early in the season and then let the ear remain upon the stock until quite late, but the difference in the weight of corn is more than made up by the loss in the value of the stalks, where fodder is an object, as it is with most farmers.

It is an almost invariable custom to plant beans and pumpkins with corn, yet many follow the plan who regard it as wrong, and others are of an opposite opinion. I have heard farmers remark that beans raised with corn cost one dollar, and others insist that they can be raised for twelve and a half cents per bushel. One of the most successful corn raisers in the county, who has, upon an average fifteen acres planted, grows pumpkins but not beans with it. If pumpkins and beans are grown with corn, it makes a great amount

of vegetation for one lot of land, and such an abundance of growth keeps the sun from the ground, causing it to be damp and cold. Beans are shaded by corn growing in the same hill, and are apt to ripen off unevenly; they also take much of the manure from the corn, which would otherwise make a heavier growth. If, however, from any cause the corn fails to come, beans can well occupy the place, or turnips may be planted in such vacant hills. We much need some careful trials to ascertain the practicability of growing mixed crops—particularly of beans and pumpkins with corn.

Implements and machines to take the place of hand labor in planting and cultivating this crop, have been in use by some of the best farmers, for many years. Corn-planters have not yet gone into general use, but the horse-hoe or cultivator is seen upon most farms. In some cases the ground for corn is furrowed out both ways, and by dropping the seed at the crossings of the furrows, the hills will be about three and a half feet apart. By this manner of planting, if the rows are straight, the cultivator can pass between them both ways, and in a mellow, clean soil, but little work with the hoe is necessary in order to keep the weeds out. It is usual to go through the field with the cultivator at intervals of about ten days, until the corn is so large that the roots would be injured by the operation.

I think it is an error, into which not a few farmers in the county are liable to fall, of planting too large an extent of ground to this crop, and not manuring it sufficiently. If the same amount of dressing which is now usually applied to two acres, was put upon one, it would be less labor to prepare the ground, there would be less labor in cultivating and taking care of the crop, while at the same time a larger yield would be the result. The land, also, would be in a better state to receive succeeding crops, and would produce grass for a longer period, without diminishing the quantity. It is also a fact worthy of consideration by our farmers, that if ground for corn has been *well* manured, it will grow during the whole season, even in the drouth of summer, and ripen earlier than that planted upon half-dressed soil. Therefore, the high manuring and thorough cultivation of land for a corn crop, will not only insure its steady growth, but increase the yield, and actually hasten its maturity.

Like other crops which the farmer raises, corn is liable to be injured or destroyed by noxious insects. Those most destructive to it are cut-worms, the larvæ of different species of *agrotis*. Dr.

Fitch* has described five varieties, and remarks, that neither the fertility of the soil or the kind of manure applied has any influence on the cut-worms, "except in making the plants grow more succulent, for it is vegetation of this character which appears to be their favorite food." About once in four years the cut-worm does great injury to corn, if it is planted upon sward land; and for this reason our farmers think it more safe to plant this crop upon land which has previously had the sod rotted by cultivation. To avoid the cut-worm, some recommend late planting. Dr. Fitch says: "Commonly only one or two stalks in a hill of corn or beans are cut off, and the remainder are left unmolested. * * * It is well, therefore, to plant so much seed as will enable these depredators to glut their appetites without taking all the stalks in the hill." This is doubtless a wise suggestion, but if they appear in so large numbers as to greatly injure the crop, the most sure remedy is that mentioned by the same author, viz., "digging the worms out from their retreats and destroying them. The safest way, however, is not to plant corn upon sward ground, but upon land which has been cultivated at least one year with some other crop.

Southern corn is now extensively planted as a fodder crop. It is sown in drills, three feet apart. The first is sown early in June, and again about the middle or last of the month. This furnishes a succession of tender feed for milch cows, at a time when pastures become short, keeping up the flow of milk at a season when it is of the most account, and also improving the condition of the animals. For working oxen engaged in fall plowing or other farm work, it forms a handy and nutritious food. The amount of green fodder which can be grown upon a small piece of ground, even, is immense, and it is a safe statement, that land under a moderate state of cultivation will produce at least six tuns of fodder per acre. It is often cured for winter forage.

3.—*Grain Crops.*

Wheat. When the county was first settled, and for many years afterwards, wheat was the crop most largely grown. The land was new and fertile, and produced bountiful returns. As fast as the trees were cut away, the growth of wood was piled, burnt upon the ground, and wheat was sown on burnt land. By this process

* "Report on the Noxious, Beneficial and other Insects of the State of New York." Vol. 1, p. 310.

considerable quantities of this grain were grown, for clean culture of the ground was not important, and the care after sowing, until harvest, was comparatively nothing. In most places, except upon the more elevated situations, frost was early, and occurred each year, owing, no doubt, to the influence of the thick forests in preventing a circulation of air and keeping off winds. For this reason corn was but little planted, and wheat formed the leading and reliable crop. Wheat was then liable to the mildew or smut, and also in some seasons to the rust. To remedy the latter evil it was sown earlier, and to obviate the former the seed was soaked in a solution of lime or ashes before being put into the ground. At this time the average yield was about twenty bushels to the acre, and considerable quantities were sold, much being shipped from the Kennebec valley to Boston, and other Atlantic cities. The price per bushel was usually eight shillings, ($1.34.)

If I have been correctly informed, after the land had been cleared of its original growth, old ground was sown to wheat, and for a number of years the yield was good, but then began to diminish. It was raised year after year, but farmers became discouraged from repeated failures, and although now and then good crops were obtained, yet its general culture began to go out of practice. The Maine Legislature at the session of 1837, passed an act giving two dollars bounty for the first 20 bushels of wheat raised by any one farmer, and six cents for every bushel over. The object of this act was to encourage the culture of this grain, and in many respects it was successful, for a considerable sum of money was paid out to farmers from the Treasury of the State, as a bounty on wheat.

The wheat midge, commonly called the weevil, made its first appearance in the county about the year 1834 or 1835; and since that time the general culture of wheat has been abandoned, although some farmers have practiced sowing a small piece each season, up to the present time. The habits of this insect are so well known, that I need not attempt a description here.*

Winter wheat has been frequently raised, but not for some years. Even when sown, its failure was, in most cases, owing to the drouth

* Recent statements in the agricultural press, announce the appearance in some parts of New York, and also in Canada, of the ichneumon fly, a "natural and deadly enemy to the wheat midge." If this parasite is found to be a formidable foe to its destructive enemy, its appearance and habitation in this country will prove a great blessing.

of autumn, and not to the severity of the winters. If dry weather followed the sowing of winter wheat, the seed was slow in vegetating, in which case it obtained but a feeble root, and of course must be a failure. If sowed early in fall, and with a usually moist autumn, so as to allow the wheat to get a good growth before the coming on of winter, this variety of wheat may, even now, be raised in the county with the average success of most crops. Shall its culture be wholly given up by our farmers?

A single word on the culture of spring wheat in the county, as it is at present. In the new settlements on Dead river, and also in some of the northern towns in the county, wheat is now grown with good success, the average yield per acre being fourteen bushels. In this section it is sown early—sometimes when drifts of snow are upon the ground when it is being harrowed—and the rust seldom injures it, while the weevil is unknown. It is also raised in Concord, Athens, New Portland and Lexington. The present season has been a favorable one for early sown wheat, and many farmers in the county are encouraged to hope that the time may come when this grain can be raised with the average success of previous years. A farmer in New Portland writes me that wheat in that section has been good the present year, the average yield, per acre, being about twelve bushels, and in some cases fifteen or twenty has been obtained. An intelligent cultivator residing in one of the river towns, who has a farm composed of a hard rocky soil, recently stated to me that during the forty years which he has resided upon it, and having raised wheat every year, he has the present season raised the best wheat grown during the entire period.

In view of these facts, it is advisable for the farmers of the county once more to give increased attention to the culture of wheat. Prepare the ground in the fall, and sow as early in spring as possible. The locations most favorable for a wheat crop, are upon elevated lands, and with a western or northern exposure. From an article in the *Maine Farmer*, of September 27, 1860, I copy the sentence which follows, as being appropriate in this place, and conveying some useful suggestions:—"The grain *must be sown early* and have passed the blossoming state, usually, by the middle of July, to avoid the weevil and the rust of wet sultry weather that sometimes occurs before late sown wheat is sufficiently matured not to be affected by it. One week's time in hastening maturity, will uniformily be gained by leaving the top soil hard and compressed, both before and immediately after sowing, either

with the roller, or, if the soil be damp at the time, with a drag lightly loaded with stone."

Barley. On account of the failure of wheat in years past, barley has taken its place, and is now largely sown. It succeeds best upon loamy soils which are dry and mellow; and as it requires but a short time to perfect its grain, the land should be in a good state of cultivation. Barley is generally sown on ground which was in corn the year previous, as it is found unsafe to apply manure directly to this crop, causing, as it does, a rank growth of straw, which often becomes lodged before the grain is ripe. Planting corn previous to sowing barley, affords a good preparation of ground, for the soil is left light and generally free from weeds. There are several varieties: the two-rowed, four-rowed, and a variety of the four-rowed called the Canada—being the most common. It is sown early, from two to three bushels of seed applied to the acre. Twenty bushels per acre is the everage yield, although much larger amounts are often grown. The heaviest yield which has come to my knowledge, is that of *ninety-two* bushels of the two rowed variety being raised upon one and one-third acres. This was in the southern part of the county, and upon a high ridge of land, the soil being a rocky loam. It is a common practice before sowing barley, to wash the seed in strong salt water, in order to cleans it from foul seed, &c., and then to mix it with plaster or ashes while wet.

Barley is a crop which has but few insects to destroy it. One or two species of fly prevail to some extent, and, passing their larva state in the straw, sometimes greatly injure the yield. In wet, backward seasons, a kind of smut called "barley brand" is found to destroy much of the grain.

Oats. This grain has been more extensively and commonly grown than any other crop of the kind. Farmers who have raised this crop for a number of years, have become satisfied that it is an extremely exhausting crop, and are giving up its culture for barley. In the newer regions of the northern towns and plantations, oats are an important crop. The interval lands are plowed up, and with no manure, yield crops of from fifty to sixty bushels per acre, year after year. That the soil will not always produce such returns, is evident from the fact that in the older portions of the county, the land formerly gave the above yields, where now but from eight to twenty-five bushels are obtained. In years past, our farmers held the notion that oats would grow upon any land, how-

ever poor and ill-treated, and they sowed largely on soil too poor for any other crop to germinate, and this with no application of manure of any kind. This plan was followed successively, as it is now in the newer parts of the county, and as a consequence the land is worn out, and it will require a long time, large quantities of manure, and a considerable amount of money to renovate it. If oats are to be sown, let the ground be well prepared; for, if an exhausting crop is to be grown, the land should of course be well dressed and prepared in a thorough manner.

Occasionally oats are much damaged by rust. It has been thought that long periods of wet or dull weather caused rust in grain; but this is not the case. It is due to the presence of a living worm, of so small dimensions as to be unobserved without the aid of a microscope. It is said that a single leaf or blade of oats is sometimes found to contain hundreds of them. The establishment of this fact opens an interesting and extensive field of study to the entomologist or naturalist, inviting investigation upon a subject but little explored.

Oats, if cut before they are fully ripe, and made considerably in the field, will yield as heavy as if cut later, and the straw makes an excellent forage for cattle. It is a fault in management, that farmers neglect their grain and allow it to get too ripe before it is harvested.

Rye was grown more in former years than it is now. By the census of 1850, the value of this crop was estimated at $8,931.25.

Previously, winter rye was sown upon burnt land, but it is now more commonly grown upon a summer fallow, deeply tilled. This crop requires a deep, rich loam, and it is also occasionally sown after corn. The first of September is the usual time for sowing, yet some sow as early as the middle or last of August. If sown early, it gets a luxuriant growth during the fall, and is also more apt to spread than if sown late, hence less seed can be used if it is put in early. The quantity of seed applied upon an acre varies from one and a half to three bushels. It is sometimes pastured in the fall with sheep or young stock, and where the growth is vigorous, with but little injury to the crop. It should not, however, be fed too close, as the liability to winter-kill will be greater. The average yield per acre may be put down at twenty bushels. The price of rye is governed somewhat by the amount and value of Indian corn; more usually being above, than below, the price of corn. In the more northern part of the county, where corn is

not so sure a crop, rye is sown extensively, and no difficulty is found in exchanging it for corn, bushel for bushel.

Buckwheat. This crop is cultivated upon a limited scale. It is sown the last of June or first of July, one bushel being considered sufficient seed for an acre. This has been regarded as an exhausting crop, but I have the opinion of many practical farmers of the county to the contrary. With a naturally light soil, and an application of one bushel of gypsum to the acre, good crops of this grain are raised for years in succession upon the same land. It is used to some extent to plow under for manure, instead of clover, and light soils, much worn out by constant cropping, can in a few years be renovated by following this practice. Particular care is necessary in curing this crop, as it should mostly be done by laying it in small bunches after it is cut, and allowing it to remain for three or four days unmoved, and then turning it over, letting it stay about the same length of time before it is hauled in. If cut before frost, the straw makes a very good fodder. Many farmers who make no account of buckwheat as a grain crop, sow a small quantity as food for bees—for the blossoms furnish a rich food for them as long as they remain fragrant.

Flax, which was an important crop in former years, has gone entirely out of cultivation.

4.—*Potatoes.*

More attention has been given to the culture of potatoes for several years past, than to any other crop; and this interest is not confined to the old varieties, but to newer and more promising sorts. It is but a few years since the old red, yellow, peachblow and kidney, were the varieties everywhere grown—now these are almost entirely unknown, while we have in their places the White Mountain, State of Maine, Jackson, Orono, Foot, Jenny Lind, besides numerous other seedling varieties. The Philadelphia or Chenango is grown upon the light, sandy loam of some of the river towns. They are more liable to rot than most other kinds, especially in a wet season; yet surpassing, as they do, for table use, all other varieties, they are raised for home consumption and for the Boston market. Next to the Chenango, the Jackson and Carter are the best table varieties. The Jenny Lind or California is the largest growing sort, exceeding in size and great bearing qualities the old-fashioned long reds. Upon land in a good state of improvement, two hundred and fifty bushels of Jenny Linds are

obtained from an acre. They are not suitable for the table, but are excellent for stock, and I think it would be found more profitable to grow them for feeding out to stock, than to grow carrots for the same purpose.

As a general rule, manure is not applied directly to the potatoes in the hill, but if old pastures are not plowed up and planted to them, a light dressing of manure is spread on and worked into the soil with a cultivator or small plow. It is thought that potatoes are more liable to rot if manure is applied in the hill. Plaster is used in the hill, and with good results.

During the last fifteen or twenty years, the rot has seriously injured the potato crop in the county, as it has in other sections of the State; and various experiments has been carried on to find out, if possible, the cause of this universal and alarming disease, and to discover a remedy. These have been tested upon different soils, and with potatoes planted in different ways, yet no satisfactory conclusions have been reached. For a time it was supposed that seed potatoes obtained from distant places—if possible from those sections where the disease was unknown—would help to avoid it; and this was done in many instances with favorable results. New varieties are generally less liable to rot, and from this fact it may be an object to grow them, and also to devote some time to the culture of seedlings to take the place of those which are liable to become diseased.

Farmers need to grow an early ripening sort, not only that they are generally more free from rot, but that they can be dug before the wet fall weather comes on. Potatoes should be dug in dry weather, and placed in bins or barrels in a cellar, but not in too large heaps, as they are likely to heat, and become more subject to disease from this heating process. It is a common practice with our farmers to sort their potatoes in the field, making three classes of them, viz: No. 1, for market; No. 2, for planting and for table use, and No. 3, for hogs or cattle.

Some speculation has arisen regarding the best size of a potato for planting. It is stated upon good authority that small potatoes will produce a progeny of as large size as those of larger growth. Dr. Reynolds,* in speaking of this fact, writes: "The tuber is not a seed. It consists of a material prepared by the plant to nourish the bud or eye, which is a true bud, until it can form roots and

* "Transactions Massachusetts Society for Promoting Agriculture." New Series, vol. 1, page 215.

leaves by which it can obtain from the soil and atmosphere its own nutriment. Each bud or eye has its portion of the nutriment assigned to it. The larger the tuber, the more buds belong to it. So that it often happens that the eye on a potato of moderate size has as much nutriment stored up for its future growth as the eye of a large one."

The annual value of the potato crop in the county is estimated at not far from $7,000.

5.—*Orcharding.*

The soil of Somerset county is well adapted for orchards. The cold winters, the careless treatment of the owners, and the ravages of the borer and other insects, are draw-backs which can be remedied only in part. A large number of farmers give no attention to their orchards; the trees are neglected, and although they are acquainted with the fact that their orchards are growing unproductive each year, and multitudes of trees are left to die, yet the efforts put forth to renovate them are very limited. The large demand for apples, however, for the Boston and New York markets, during the past few years, and the generally high price for very nice fruit, have led many farmers to devote more attention to the culture of their fruit, and to the better care and improvement of their orchards.

By far the larger number of the orchards in the county are old; that is, trees which have never been grafted, and in other respects, left to take care of themselves. Where such orchards are found, three things are necessary to be done in order to improve their condition. First, manuring. If the farmer regards it as important to return to his tillage land in manure what has been taken off in cultivated crops, why should not the same rule follow in regard to the orchard which has produced fruit year after year with no application of manure whatever?

In manuring an orchard it is quite as important to have the whole ground well dressed, as to have the land near the tree in good condition. In manuring old trees, the best method is that given by John J. Thomas, author of the "American Fruit Culturist." His remarks are as follows:—

"When old trees become feeble, there is no better way of imparting to them vigor, than by *manuring*. Instead of adopting the more common practice of digging a circular trench around them and filling this with manure, the operation may be performed

in a more perfect and efficient manner by digging narrow radiating trenches from within a few feet of the trunk, directly from it—this will prevent cutting many of the roots. These may then be filled with a *compost*, made of turf, stable manure, ashes, and perhaps a little bone manure—the turf to be the chief constituent, say one-half or two-thirds—and the ashes say one-thirtieth. The bone manure is not essential, as its constituent parts are in common manure in small quantities. If this is done in autumn, the roots will be prepared to penetrate it early in spring, and if the tree is not past recovery, it may take a new start. The roots, probably, extend as far each way as the height of the tree, and the trenches should extend about as far. They need not be cut very near the tree, as the roots are all large there, and would be more likely to be injured and would be little benefited. The trenches should be only the width of a spade, and may be two to four feet apart."

Second, pruning is essential to the thrift and good condition of an orchard. As to the proper season for performing this operation, many different opinions are put forth—some regarding the spring, and others the fall as the better time. Others yet, are not particular as to the *time*, but as to the *manner* in which the job is accomplished. Dr. True says: "The early spring months are usually the most convenient for this purpose, and I never could perceive any injury to the tree; but it is absolutely necessary that the wounds be covered with a coat of paint. Red ochre and linseed oil mixed together quite thick, and put on rather liberally with a brush, is as cheap and as good as any thing."

Grafting, is the third means of renovating old orchards. For the method of doing this, I refer the reader to a communication which I shall presently make extracts from.

With the exception of the natural fruit, the more common varieties are the Fall Pippin, the Pearmain, the Greening and the Roxbury Russet. The Thompson is an excellent fall apple, and the Somerset, which originated in Mercer, is a large, good flavored apple, but will not keep through the winter.

Pears, peaches, and the list of small fruits, receive but little or no cultivation. Cherries, horse-plums, and currants, are often seen in gardens and by fence-sides, but as a general thing they are neglected and uncared for. Greater attention to these fruits would demand but little of the farmer's time, and their yield would add much to the luxury and pleasure of living.

It gives me pleasure to add to my own imperfect remarks, a

communication from a gentleman residing in the eastern part of the county, who has devoted much time and spent considerable money in renovating an old orchard and setting out a new one. From his long practice and experience in orcharding, he is well prepared to speak upon the subject. In the closing part of his article—which is here omitted—he makes the true and well known remark, that "a man may read and well digest all the written works in the world on fruit-growing, and still he will need practice and careful observation to well understand and master the business." He writes:—

"Almost every farmer in this vicinity has more or less apple trees, either old or young, or both; and from 1840 to 1857 there appeared to be a growing desire to increase the quantity and improve the quality of apples.

Many orchards of all ages and conditions were grafted, and others set, mostly, however, with trees from New York nurseries. These latter have proved almost a total failure, and the former, owing either to a want of skill in setting the scions, or subsequent neglect, or both, have signally failed to meet the expectations of their owners. More especially has this been the case with orchards that had been set twenty-five years or more. Younger trees have succeeded better, though it can hardly be said that they have proved a success. These unfavorable results added to the disastrous effects of the long-to-be-remembered winter of '56 and '57, have left a very general impression that apple-growing is at best, an uphill business. But be that as it may, it is a notorious fact that most of the orchards in eastern Somerset are much neglected. Usually, they are kept in grass which is either mowed or fed by sheep and swine. They are seldom cultivated or manured: occasionally imperfectly pruned, and thus left to take care of themselves. Such is the practice generally, I think, in northern Maine. The cultivator may as reasonably look for good crops of corn as of apples without manure and care.

To insure success, trees must be relieved of the numerous tribes of insects which prey on their fruit, leaves, bark and wood. Of all the depredators on the apple tree and its fruit, in this vicinity, none equal in mischief the apple-worm, (codling moth,) and the borer in the *branches*. The moth destroys the apples and the borer kills the trees. The borer in the trunk is readily detected by the saw-dust, and easily removed; but not so with the bark or branch borer. This insect enters the bark when it is very small, and there

it remains boring in all directions, living on the *live* bark and sliver; but not as Dr. True asserts, on the surface of the sap-wood beneath patches of *dead* bark. See third annual report of the Secretary of the Board of Agriculture, page 175.

The insect frequently found *under patches* of *dead* bark is not the cause, but the effect of this injury. They are flatish, have very large heads and feed on the partially decayed sap-wood *after* the borer kills the bark. The bark borer is much smaller, rounder and has a redish head. From its smallness and insidious attacks it generally baffles the closest scrutiny till its ravages have extended some inches, (if the branch be large,) when the dead appearance of the bark gives evidence of the concealed enemy. Large branches long infested frequently present a scabby appearance and throw out numerous shoots.

Last season I observed that one fine scion (with two branches) was frequently visited by woodpeckers. Last May one of the branches appeared nearly dead, and the other looked sickly. On examination I found the branch nearly girdled, and several holes made by the peckers in the bark of the live one; and although I saw nothing else which indicated the presence of borers, I began to cut carefully with the point of a sharp knife, and soon discovered traces of the little rascals, which I followed till I took six of them out of a branch less than two inches in diameter. I have spent weeks removing the dead, and examining the live bark of trees infested with these borers—have probably killed thousands, but seldom found any of them in or "under patches of dead bark."

The remedy is to cut them out, if to be found; remove the dead bark and cover the wounds with a mixture of tar and finely pulverized brick dust laid on quite warm with an old paint brush. This mixture, or composition, (if well supplied with the brick dust,) will effectually preserve the wood and last longer than two coats of ochre and oil. It may be safely applied, even hot, to all wounds on the apple and other fruit trees. I have frequently found branches and their laterals so badly injured that it was necessary to cut them off, and when thus removed from the tree they ought to be immediately burned. I have examined many orchards in this and in Piscataquis county, all of which are more or less injured by these borers.

The most of the grafting in this vicinity has been done by the job at a certain price per scion for all that lived till autumn; thus allowing the operator to cut as many or as few branches as he pleased,

and where he could make the most profit. Men thus employed usually select the more thrifty trees, and cut them to a dead certainty, in order to get in as many scions as possible. Trees treated in such a manner may sometimes survive the shock, though the greater portion of them die in a few years.

If trees six inches or more in diameter are to be grafted, great care should be had to cut sparingly. Select a few of the most vigorous branches, cut them where the diameter does not exceed one and one-half inches, (less is better than more,) and leave sufficient laterals to sheath them with sliver. The laterals may be removed by degrees as the scions increase in growth, and thus continue year after year to cut and remove laterals, till the whole top is transformed.

After a certain period in life, trees, like men, begin to decline in vigor; hence, if an old tree is to be grafted the scions should be *strong, fast* growing varieties. Slow growing kinds, if desired, will answer for young thrifty trees, but should never be set in old ones, though perfectly healthy.

In this vicinity I have found May the month—and the new or old of the moon to be the better time to set scions. On or near the full, the bark slips from the wood more easily, and a scion seldom takes where the bark starts from the stock. Grafted trees should be examined in spring and autumn, and the stubs, where the wax has cleaved off, cemented over to keep out the rain and snow till healed over; this is important, as otherwise many stocks will rot and the scion die.

Plowing among *thick* set and *full* grown trees is of doubtful utility, but remove the grass and weeds around the trunks, manure the face of the whole ground liberally late in autumn, and the trees will thrive and bear well."

6.—Root Crops.

Of late years more attention has been given to the cultivation of root crops than formerly, but even now they do not occupy that place among the products of the county which their merits demand. Led to the culture of other roots from the ravages of the rot among potatoes, many of the farmers of the county have become aware of their value and importance, not only as an important farm crop in themselves considered, but as a most valuable substitute for the potato as a feed for farm stock. A great obstacle to their more extensive cultivation is the labor required upon them,

for with the exception of the English flat turnip, most kinds are not raised without considerable care and expense.

Carrots are grown to considerable extent. They require a deep, rich soil, and in favorable situations yield as high as one thousand bushels per acre, although about six hundred is a more common yield. The objections to the carrot are, that it needs more labor than other roots, is somewhat liable to rust, and growing so slow in spring and summer, the ground is apt to become full of weeds before the carrots are large enough to have the weeds removed without greatly disturbing them. The cultivation is mostly done by hand, and with a common hand-hoe; but the same could be done quicker and cheaper by a wheel-hoe, thus diminishing the cost of production. Some farmers have practiced sowing a few seeds of buckwheat or radish in the row with carrots, and these starting first, allow the ground to be cleansed of weeds, if necessary, before the carrots fairly make their appearance; and they are pulled out at the second weeding. I have noticed that carrots are often left too thick; they should be at least four inches apart in the rows. Of the varieties cultivated, the long orange and the intermediate are considered best, while the white Belgian is rather more easily harvested, from its habit of growing partially out of the ground, and is grown in some parts of the county. As to the value of carrots for food, there is but little to be said: all kinds of stock, without an exception, are fond of them. Horses thrive well upon them, hogs will not only grow, but fatten, if fed with them, and cows will yield the richest milk, in winter, if fed upon carrots in connection with hay.

Owing to its more easy cultivation, the ruta-baga is raised somewhat largely. It is generally sowed in drills, upon sward land, highly manured, hoed three or four times during the season, and thinned to one foot apart between each turnip, the drills being three feet apart. A slight sprinkling of plaster is administered to the plant as soon as it is out of the ground. The seed is sown about the 20th of June. The ruta-baga will keep better than the English flat, and they are retained by systematic farmers for feeding in the last part of winter and early part of spring. The cost of production is variously estimated, but by none does it exceed in labor and manure over five cents per bushel.

In many respects the English flat turnip is the most economical of all the root crops raised. The seed being sown about the last of July, and often as late as the middle of August, from which

good crops are generally harvested; they can take the place of early vegetables, thus securing two crops from the same piece of land in one season, which, with small farmers, is an important consideration. It generally takes the place of early potatoes and peas, and is often sown broadcast among corn when it is being hoed the last time, interfering very little with the growth of the corn, as the turnip grows almost wholly after the corn has become full. Thus the only actual cost of this crop is the harvesting. They are consumed during the fall and early winter. I know of no experiment having been made by farmers in the county to test their feeding properties in comparison with the carrot, but it is generally considered that as a food for milch cows, they cause a yield as large in quantity, but not of so good a quality.

The mangold wurzel, or field beet, is not generally cultivated. It needs a deep, rich soil, and heavy manuring. It contains about as much nutritive matter as turnips, and produces a heavier crop per acre. It will keep into April, and forms one of the best articles for milch cows, and in fact for all farm stock, that can be raised. Its culture should receive more attention among the farmers of the county.

The sugar beet and parsnip are occasionally grown, and are both nutritious and wholesome, either as a food for man or beast.

From my own observations, I am led to believe that the growing of some of the above mentioned roots should be a prominent feature upon every farm in the county, where stock of any kind is kept. At present, their cultivation is somewhat limited, and even many extensive farmers raise only enough for consumption in their own families, at the same time being unaware of their full value for the purpose of feeding out to stock. During the long and severe winters usually experienced in the county, they furnish that nourishment which is peculiarly fitted for stock obliged to be kept on dry forage, serving to promote their thrift and health, and also affording a necessary change in their food, which is so indispensable to their best condition.

It is also important that each farmer should know from actual trial, something of the feeding and keeping qualities of the various kinds, not only that he may have a succession of them, but that he may find out the most profitable variety to cultivate and also which is best suited to his own soil.

7.—*Maple Sugar.*

The sugar maple (*acer saccharinum*) is one of the most interesting and useful of our native forest trees. There are enumerated, by botanists, thirty-four species of the genus *acer*; nine of which belong to America, twelve to Europe, six of extreme loveliness to Japan, and the rest to various parts of Asia. Prof. Gray has proved that Linnæus established the *A saccharinum* upon a specimen of the white maple, (*A dasycarpum,*) but as it was done under a mistake of its character, the right name has been used by all succeeding botanical writers.

In Somerset county the sugar maple abounds, and in situations where the soil is of good quality, attains a large growth. The manufacture of sugar and molasses from the sap of this tree, has become an item of considerable account in the statistics of the county, and it is also one of the most valuable staples produced. By the census of 1850, the value of the molasses and sugar made in the county was $1,493.75; since that time it has more than doubled.

The process of obtaining the sap and making it into sugar and molasses, is very simple and needs but a brief description. The tree is tapped with an auger three-fourths of an inch in diameter, into which a spout a foot in length is placed to conduct the sap into a vessel placed to receive it. These were formerly troughs dug out of some soft wood, such as fir or bass, each of which would contain from one to two pails of sap; but recently the business has so much increased that unpainted cedar buckets made especially for the purpose, are used in most cases. They hold twelve quarts, are obtained for a shilling each, by the quantity, and will last many years. In some cases, tin vessels are used to catch the sap, and are considered better than wooden buckets for this purpose, because they are more easily cleaned.

The sap is collected from the trees once a day, usually in the morning, when it is immediately strained into the boilers. When boiling down, one boiler is filled from the other, and this again supplied from the store tubs. The sap is boiled as fast as possible, for the sooner it is boiled after being collected, the whiter and nicer the sugar will be. Farmers who make an extensive business of sugar-making during the sap season, have a rude camp erected in the grove, where the sap is boiled down, and where all the tools used in the business are kept; but producers upon a small scale perform this part of the work at their own houses.

After the sap is reduced to the consistency of syrup, the process of making it into sugar, is as follows: it is first strained into deep narrow vessels and allowed to settle for a day or two, when it is poured out, free from the settlings, into a smaller kettle and placed over a slow fire. Sweet milk or beaten eggs are put in to raise the scum, which is removed as fast as it appears. After the scum has been all taken off, the fire is increased and the syrup boiled until it is of sufficient thickness to cake, which can be readily told by its becoming hard if dropped upon snow. It is next poured into a trough or tub kept for the purpose, and briskly stirred for a short time, when it is dipped into moulds, usually made of tin, and previously wet to prevent the sugar from adhering, and when cold is ready for the market. The price, per pound, is twelve and a half cents.

Farmers who only produce sap enough for their own use, boil it into molasses, which is much better for ordinary purposes than sugar. Maple molasses, however, readily finds a market at all villages in the county, where it sells for one dollar per gallon, and many prefer to manufacture this rather than sugar.

Maple sugar often contains oxide of iron, which it dissolves from the iron kettles in which it is commonly boiled down, and this causes it to turn black; hence it is highly important that great care should be taken to have the kettles well scoured with vinegar and sand, and all operations conducted with extreme neatness. Pains should also be taken that the syrup is not burnt, by having too hot a fire at the close of boiling down. If acid, a little clear lime water put in the syrup will saturate it, and the principal part of the lime will separate with the scum, which must be often removed during the process of boiling.

The sap begins to flow freely about the first of March or middle of April, but the exact period varies much with different seasons. The product of a single tree of the sugar maple, varies considerably with its size, and according to the season. By some farmers it is said to amount to five or six pounds (of sugar,) per tree, while others estimate it much higher. I think the average cannot be stated at more than two pounds, taking the seasons together. Sugar and molasses making are profitable and pleasant parts of farm labor, and in this county, as previously mentioned, are occupations of much importance. It should be also remarked that their manufacture is carried on at a season of the year when the general operations of the farm have not resumed their activity; the whole

season of making, occupying but three or four weeks from the commencement.

Previous to 1840, more sugar and molasses was made per annum than for ten years following. Dr. Jackson, in his geological report for 1838, gives some statistics showing the amount of sugar made in five towns in the county the year previous. These are given to show to what extent the business was then carried on:

At the Forks of the Kennebec, 12 persons	3,650	lbs. of sugar.
On No. 1, 2d Range, one man and boy,	1,000	" "
In Bingham, 25 families,	9,000	" "
In Moscow, 30 families,	10,500	" "
In Concord, 30 families,	11,000	" "
Whole number of pounds,	35,150	

This at twelve and a half cents per pound would amount to $4,193.75. By the above it will be seen that the quantity of sugar made in the county greatly diminished during the years from 1840 to 1850; but since that time more attention has been given to this branch of industry.

The sugar maple has not been very highly valued by the farmers of the county; for while considerable sugar is made in some portions, in others, but little is manufactured because it is said not to pay. But if every farmer was aware of the productiveness of groves of this tree, more care would be manifested upon their part for their preservation and culture. In some cases, maples are exterminated from the forests for fuel and other purposes, as if they were of no more importance than trees of birch or beech, and as though their only value consisted in the money they would bring for wood, at so much per cord. Where land is being cleared it is doubtless very difficult to save any trees from destruction by fire, but in lots where the growth is reserved for fuel or timber, they can be saved from the woodman's axe, and the younger trees of this species trimmed and allowed to grow. In some of the older towns they are rarely to be found in large numbers, and in such places they should be transplanted, where practicable, and their importance and value will increase from year to year. Upon this, Dr. Jackson remarks as follows: "Maple trees may also be cultivated, and will become productive in twenty or thirty years; and it would certainly be one of our most beautiful pledges of regard for posterity to plant groups of maples in convenient situations upon our lands, and to line the road-sides with them. I am sure such a plan,

if carried into effect, would please public *taste* in more ways than one, and we might be, in part, disfranchised from dependance on the cane plantations of the West Indias."

In view of the fact that the sugar maple is being rapidly cut away from our original forests, would it not be well for our agricultural societies to encourage the culture of this tree by offering premiums for groves or plantations of them?

V.—Fences.

In making an agricultural survey of any district in the State or county, the condition of the fences within its limits must not escape notice. Poor fences, which, next to poor buildings, are a sure sign of bad management and thriftless husbandry, are objects of common occurrence in travelling through the county—while *good* fences are in most cases the exception and not the rule.

As a general thing, I think our farmers do more useless work in the building of temporary fences than in any other operation of the farm; but in many instances they are so situated that it cannot be well avoided. For instance: corn is planted this season in a part of the mowing field, and before it becomes fully ripe so that it can be cut and moved, it is necessary to turn in the stock to obtain the advantages of rich fall feed. But a fence must first be erected to inclose the corn, the making of which will occupy several days of hard work, and also requiring as much to remove it again, after the corn is harvested, or in the following spring. Therefore, so long as we cannot wholly dispense with fences, it is important to have farms divided into fields of convenient size.

The principles of fence building, together with the rules which should govern the operation, seem to be three:—1st. Where are fences most wanted, and of what shall they be built? These are questions which each farmer can best decide for himself. The circumstances by which he is surrounded, and the materials at command, give every one an opportunity to arrange the manner of building and the choice of materials, to suit his own particular wants. Fences dividing lots or farms should be permanently built of durable materials; next, the division of pasture and fields, and then the sub-division of fields so as to facilitate farm labor, particularly the rotation of crops and expeditious culture. As to materi-

als, the fences must be built of such as are most easily obtained, and this can also be regulated by each person. In some places stone can be used, in others, cedar, and in many localities ash, maple, poplar, or hemlock sawed into boards, are used to good advantage. 2d. Farmers build too much poor temporary, or good-for-nothing fence; and this statement is proved by the abundance of fence of this description to be found in the county. The habit of building poor fence begins with farmers when they first commence the work of clearing land. They are then obliged to erect fences of any available material—usually of timber or logs of old growth—and the manner of building is that which can be done in the shortest time, and at the least expense. This log fence forms a foundation which is repaired each season, and as farmers in a new settlement have much to accomplish in the way of making improvements, the habit of mending up old fences is formed, and the plan of making new ones neglected. In some sections of the county, even in old towns a considerable amount of this log fence is yet to be met with. This leads me to the last suggestion, which is: 3d, that it should be a principle with all farmers to build some new and permanent fence of durable material, each year. Greater improvement is not wanted in any of the manifold farm operations than in building fence; and perhaps nothing more plainly shows improvement than this.

In Somerset county there is every kind of fence, and almost every kind of material used for fencing. There is good fence and poor fence; fence which has been standing for half a century, and that newly built; fence of posts and rails, and fence made of rails, stakes and bunks; stone wall, board fence, wire fence, and in many places *no fence*. Through the northern and eastern portion of the county where cedar is plenty, there is an abundance of morticed, or post and rail fence; and there is no better fence built than that erected of this material. In the older settled towns some of this kind of fence is seen, but it is generally of long standing, and the present high price of cedar makes it necessary for farmers making new fences to build of some other material. In situations where stones are found—particularly upon high ridges of land, they are made into wall, thus clearing them from fields, and forming a permanent and good fence. Board fence is more common than wire, although both are made, and the latter is being somewhat generally adopted, and notwithstanding the objections urged against it, is coming into favor.

Some account of the different materials used in the making of, with notices of the various kinds of fences most generally built, together with one or two suggestions, and I will close the present chapter.

White cedar (*Thuya Occidentalis*) is the most durable and valuable wood for the purpose of fencing, which we have. In the central part of Somerset county, this tree is not so common as formerly, for it has been extensively cut off for fencing and building; yet, upon many farms in this section, there is much cedar fence built of posts and rails which have been standing for a number of years, and is now in good repair. Throughout the eastern and northern towns in the county, cedar grows in swamps and low runs between higher ridges, and also upon the margins of ponds, where it reaches a considerable larger growth; and besides being used for fencing, it is employed for making shingles, &c.

Next to cedar, for durability and strength, is the white ash, (*Fraxinus Americana,*) and the only objection urged against it, is that it is much heavier to handle, not only when first cut, but after it has been seasoned. In towns where the former timber is not generally found, white ash is largely used for the purpose of building fence. It is not, however, made into rails and set in posts, but is usually set in stakes and bunks, or built in a crooked, zigzag manner, sometimes called Virginia fence, with cross-stakes and riders.

Fences are often constructed of the white maple, and as the wood is durable it answers a good purpose, where cedar or ash cannot be obtained.

Many of the farmers in the county have recently been using considerable quantities of black poplar, (*Populus Balsamifera,*) perhaps on account of the scarcity of better and more durable material. If the wood is cut in December and the bark taken off, and put into fence the following spring, it will last fifteen years. Sometimes it is cut in June, as the bark starts more readily at that season; but if put into fence immediately, it is apt to crack in seasoning, and the water lodging in the season cracks soon causes it to decay. This is not so liable to be the case if the rails are cut in December. There are two varieties of the poplar common in our forests, the difference in which appears to be chiefly in the color of the leaves, and in the texture of the wood. The black poplar, just mentioned, has a leaf of a dark green color, with a greyish white bark, the grain of the wood being free and open.

It splits easily and forms excellent rails. Although a light wood when seasoned, being easily handled, it is a durable and smart timber. The white poplar has a bark somewhat rough, and the wood is hard and close, spliting with considerable difficulty. It is usually a week later in leaving out than the other variety.

Stone forms an excellent material for fence, and is without doubt the most efficient and durable that can be built. Upon land of a clayey loam, it is liable to tumble down by the action of frost, but if properly constructed, this liability may be overcome. There is in the county much stone wall laid in a cobbling way, with perhaps a top-rider of ash or maple, but this proves to be a poor and unsubstantial fence. Stone wall should be so laid that it will be perfectly compact and solid, with no spaces or holes between the stones, and also so constructed that each one will bind from face to face. It is surprising that some farmers will clear their fields of stone and put them into heaps, or piles, which are constantly an interference in cultivation; or even haul them into some remote corner, to become a hedge of briars and foul weeds, when, with but little extra expense, they can be made into a fence which will last during many generations.

I cannot say what particular kind of fence is most common upon farms in the county. We have the cedar post and rail fence, fence constructed of poplar rails set in stakes and bunks of cedar, and also considerable board fence, and stone wall. I have said that wire fence is being somewhat extensively used at present, and in sections where other durable materials are scarce, it forms a permanent and cheap fence, if the posts are made of iron or cedar. No. 9 wire seems to be the preferable size for making fence intended as a division of fields or pastures. Many farmers who have built wire fence and been unsuccessful in so doing, have generally been ignorant of the proper way of making it, and of the fact that wire expands or contracts as the weather is warm or cold. It is true that in a hot day wire will expand, while in a cold one it will contract; and those who have made considerable wire fence, estimate this expansion and contraction in a continuous strand of fence twenty rods long, to be from four to six inches. Posts for this fence should be placed eight feet apart, the strands of wire six inches apart, five strands high. If the anchor posts, or those at each end of a strand, are set very firm, the wires will break in a cold day, unless a spring or strainer is used to regulate the wire. This spring should be of sufficient power to sustain a pressure of 800 pounds, more or less,

according to the size of the wire. Better than a spring fastened upon the anchor posts for regulating the wires, is a straining post, described by S. Edwards Todd, an intelligent agricultural writer, and a practical farmer, in his excellent "Treatise on Fences."* His description follows:

"Set the straining posts three and a half or four feet deep: they should be made of good timber, not less in size than three inches by six square, with two-inch auger holes in one of them, and holes two inches square in the other. In order to have the holes correspond exactly with each other, the square holes should be made before the post is set, and after they are set, the auger can be run through the square holes, in order to bore those in the opposite post. These posts should be set at least three inches apart. The *strainers* * * should be made of the most firm and tenacious wood, about one foot in length, with four inches of one end four-square, and the remainder turned round. The wires are put in a small hole through these strainers and wound up with a wooden wrench, three feet long, fitted to the square end of the strainers. When the wires are sufficiently tight, let the strainer be driven into the square hole and the wrench taken off. When a wire is to be loosened, drive the strainer a part of the way out, and let it unwind."

It may be an object for farmers to practice steeping or soaking posts for fence, especially if wood is used which is somewhat liable to decay, such as maple, &c. It is contended that wood soaked in a solution of sulphate of copper, becomes more firm, and will consequently last much longer on this account. Even stakes of the white birch, (*Betula Alba,*) subjected to this treatment, have been known to last in the ground for seven or eight years. I am not aware that any of our farmers have tried this plan.

Much has been said upon the question of fence or no fence, in the soiling system, but we are not yet prepared to dispense with our fences altogether, yet I am not prepared to say but what it would be best for farmers to work gradually into this method of farming, as there are many advantages resulting from it, not the least of which is the immense saving of fencing. Hon. Josiah Quincy † remarks that this system not only saves the material used for fences, the labor of erecting them, the cost of keeping in repair, but it also saves the land occupied by fences, together with the

*Transactions New York State Agricultural Society for 1858, Vol. XVIII, Page 417.

†Essays on the Soiling of Cattle, Illustrated from Experience, &c., by Josiah Quincy, Boston, 1859.

headlands, which are generally left to grow up with noxious weeds and send their foul seeds over the entire farm. The result of soiling cattle, is the absence of all interior fences, for they are absolutely useless. The same author further says, (p. 49,) "Whoever commences the system should begin on a small scale; experience will show the way to success. The great profit of the system is the abundance of manure which it insures, of the best quality, at the cheapest rate. The importance of manure to successful husbandry, it is not for me to explain. Whoever has no funds to purchase it, will find no mode so sure, so cheap, and so easy to obtain it, as the system of soiling."

As to the proper time for cutting timber for fencing, various opinions prevail. The most correct one, however, seems to be that timber cut late in autumn, will last longer than that cut at any other season. The reason for this is that the new wood has attained its maturity; there is, therefore, less albumen and sap in the wood than at other seasons of the year. Timber for fence would last much longer if it was allowed to get thoroughly seasoned before used for the purpose.

I have said that poplar rails will last about fifteen years; but even at this rate, the farmer who owns a large farm with no other material for fences, would be kept busy simply in building and repairing them, for by the time he had completely enclosed his fields, the first erected would need repairing. We want a durable material, which can be obtained at a cheap rate. Wire, I think, with cedar or iron posts, supplies this want. Our farmers must resort to it, when the materials now at hand are found unsuitable, or have been entirely used up.

VI.—Agricultural Societies, &c.

In Somerset county, there are four Agricultural Societies, all earnestly engaged in promoting the advancement of scientific and practical agricultural knowledge. The oldest of these is the East Somerset, incorporated in 1832, which is now located at Hartland. The Somerset Central is the next oldest, having been incorpoated in 1838. For a series of years, the exhibitions of this society were held in different towns, and were thinly attended, but little interest being felt in its operations. In 1856, the society purchased a lot

of land in Skowhegan, enclosed the grounds, and have located their annual show and fair at that place. Previous to 1857, exhibitions had not been held by this society for many years. In 1848 was incorporated the West Somerset Society, the show of which was held alternately at Madison and Anson. Within a year or two they have purchased and enclosed grounds at Anson, and the exhibitions are well attended. The North Somerset, which completes the list, was incorporated in 1856.

So far as I am informed, there are but two Farmers' Clubs in the county which are permanently established. One at Norridgewock instituted in 1857, and one at Anson established during the same year. These societies hold meetings each week in the winter season, for the discussion of topics connected with agriculture, both of a practical and scientific nature. Papers are often read by some of the members, which bring out the results and opinions of others present, and facts are communicated at each meeting which are of great practical value and importance. From the records of the Farmers' Club of Norridgewock, I take the following list of subjects which have been talked over at previous meetings during a few years. They will give some idea of the interest manifested by the members for the successful working of the society: Root crops; manures and their application, four evenings; best method of seeding land, three evenings; grass culture; sheep husbandry, four evenings; farm buildings; cultivation of corn; fences and fencing, two evenings; horse shoeing, three evenings; orcharding. This club has also a small library, and a cabinet of minerals, and specimens of natural history.

It is only necessary for me to say in regard to our agricultural societies, that they cannot but exert a wonderful influence in the improvement of the agriculture of their own immediate vicinity, if they are rightly managed and properly conducted. It is a question which may be raised, but it is one which I do not propose to consider, whether a greater benefit would not result from them if the present rules of management in regard to locations, entrance fees, &c., were dispensed with, or somewhat modified.

Notwithstanding the decided improvement which has been going on for many years past among farmers in the county, there is yet room for greater advancement. Improvements are manifested in the breeding of farm stock, which is attended to with more care and attention; in the better cultivation of the farms with greater returns in crops and produce; in adapting manures and crops to

soils best suited to their nature; in better and more convenient houses—including dwelling house, barns and other buildings—which are generally well painted, and kept in neat order and good repair; in better fences; in a greater regard to the beautiful as shown in the growing of ornamental trees and shrubs, and also in having tasty front yards and good vegetable gardens. Cellars and sheds for the protection of manure, are common, and barns are now seldom erected without one or the other. The character and value of the sheep, horses, and neat stock, has largely advanced, and Somerset can now produce as good specimens, in each class, as can be found in any other county in the State. There are, however, many defects to be remedied, and many errors to guard against, which I shall attempt to point out hereafter, satisfied with the present upward tendency of the great mass of our farmers as being in the right direction, and as leading, ultimately, to a more perfect success.

I give, below, the statistics of the agricultural productions of the county, as furnished by the census of 1850.

TABLE

Showing the amount and value of the Agricultural Products of Somerset County, Maine, according to the Census of 1850.

	Value.		
Farming Implements,	206,355	Hay, *tons*,	66,983
Live Stock,	921,385	Horses,	4,136
Slaughtered Animals,	153,319	Milch Cows,	11,145
Orchard Produce, one year,	31,034	Working Oxen,	7,731
Garden " "	3,543	Other Cattle,	14,286
Domestic Manufactures,	64,270	Sheep,	60,074
	No. lbs.	Swine,	3,644
Butter,	757,624		*Bushels.*
Beeswax and Honey,	28,945	Barley,	13,000
Cheese,	215,155	Buckwheat,	1,236
Flax,	2,888	Corn,	183,780
Grass and other Seeds,	1,947	Oats,	328,630
Maple Sugar,	8,750	Peas and Beans,	24,046
Wool,	180,307	Potatoes,	327,556
Molasses, *gallons*,	399	Rye,	7,146
		Wheat,	56,395

VII.—Northern Portion of the County.

Of the two thousand square miles of territory embraced in the county of Somerset, only about one-third—comprising the south part—is yet settled: although it is quite difficult to tell where the division line between the settled and unsettled portion occurs. It is my purpose, in this chapter, to give some outline of the geography and geology of this section of the county, with an account of its agricultural condition and prospects: a notice of the lumbering operations, with its influence upon farming, together with a few general remarks.

Commencing at the third range of townships north of Bingham's Purchase, of which Dead River plantation, on the western boundary, forms the most important place, we at once enter the wilds of Somerset county. There is, at Dead river, a small settlement with a public house, chiefly for the accommodation of lumbermen, a post-office, &c. At Flag-staff township, in the 4th range, west, there is another settlement with good mills, a store, tavern, &c. In these two plantations is found some of the best land for farming purposes in the Dead river valley, or, indeed, in all northern Somerset. I speak now of the interval or bottom lands, which are equal to any land in the State. The higher land back from the river, is more rocky and broken, but in places not too rough to be cultivated produces good crops of grass and potatoes. During a recent visit to this section, I was informed upon good authority that a gentleman engaged in digging a well upon an interval farm, found the bones of a moose at a distance of ten feet from the surface—showing conclusively that the soil had been made to that depth by the washing from the surrounding mountains. The soil is fine, of remarkable fertility, and for grass or grain crops, produces wonderfully. Wheat is largely raised in these townships, chiefly the spring varieties. It is sowed as soon as it can be got in in spring, at the rate of two bushels of seed to the acre: the yield, usually, being from fifteen to twenty-five bushels per acre. Corn is but little grown. I am informed that it ripens about once in four years, and receives great injury from both early and late frosts. Great crops of oats are raised—fifty bushels per acre is an average yield; while in some seasons, sixty bushels are ob-

tained. A large extent of land is sown to oats year after year, with no dressing, but it is commonly seeded down to wheat with a light manuring. Rye is raised somewhat largely, and good potatoes are also grown. Many of the farmers pay some attention to the growing of clover,* in order to obtain the seed, which finds a market in older portions of the county. Hay is cut in great quantities, and finds a ready sale at good prices, being mostly carried into the logging swamps. The stock of this region sustains a good reputation: the cows, working oxen, sheep and horses will compare well with other sections of the county.

I have now briefly noticed the principal crops of this section, which, in addition to my previous account contained in the first chapter of this survey, is all that is necessary. I wish here to refer to one or two defects in connection with the farming operations upon Dead river.

First, I cannot but regard the plan as ruinous which the farmers practice, of growing so many successive crops upon the same land, without the application of manure. Now that the soil is new and fertile, great returns may be taken off and no diminution presently felt, either in the produce per acre, or in the strength of the land: but how will it be fifteen, thirty or fifty years hence, when the county is more largely settled, and when great crops will be as much wanted as now, but which cannot be raised? It is a common practice with farmers to sell off most of their hay in the fall, to lumbermen, the usual selling price of which is $12 per ton: and also the greater part of their oats, which bring from forty to fifty cents the bushel. By this method, many winter but little stock, principally young cattle, which they manage to get through upon straw and rough fodder. This practice gives but little manure, and that of a poor quality, which is but seldom used, for no account is made of it, hence little is as good as none. Some farmers, however, who are satisfied of its importance to the land, and to the growth of crops, consume all that is made upon their farms. It is plain to see that if the present course is followed for years to come, as it has been since it was settled, it will not be long before

* The clover is cut when about two-thirds of the heads are ripe. It is carted into the barn and threshed out during the winter season. This is done with flails, and often by driving oxen over it as it lays on the floor. The clear seed is separated from the chaff by means of a clover huller, and what chaff remains, after having been cleansed, is used by the farmers in seeding their own land. The straw is fed out to young stock. A ton of clover hay will produce about one hundred pounds of clover seed, the usual price of which is ten cents per pound.

the soil will be as much exhausted as the fields of the older towns in the county at the present day. The present practice is a bad one, both for the farms and the farmer; impoverishing the one, and completely wearing out the other. When shall the evils which I have pointed out be clearly seen and remedied?

Again, where lumbering is pursued by many as a chief business, agriculture is apt to be neglected. This is particularly the case in sections in the immediate vicinity of the lumber regions, as at Dead River, &c. Men can receive good wages in the logging swamps in winter, and upon the river in the spring and summer; hence, farming is not pursued with much of interest or attention. If those who have farms go into the woods for the winter, they often return late in spring, the work on the farm is done in a hasty manner, the crops are in some cases left to themselves, and the result is often poor or light returns—except in situations where the soil is fertile, clean and productive.

There are in Somerset county north of range III, east Kennebec river, six townships. In this section there are several ponds of considerable size, with streams emptying into the Kennebec, which furnish good chances for lumber operations. The Canada road follows the river on the east side, as far up as the Forks, at which place it crosses the Kennebec, continuing in a direction north west until it reaches the line. From the Forks, the county is thinly settled to Holden township, a distance of about thirty miles, there being here, and at Dennes plantations, which joins, a small settlement. At Parlin Pond township, is a U. S. Custom House, post office, &c. This place is about fifteen miles north of the Forks. According to the report of Dr. Jackson, the rocks along this space are found to consist of argillaceous and calciferous slate, with numerous beds of fine grained graywacke. Small deposits of bog iron ore also occur in this vicinity. The forest growth consists of mixed soft and hard wood trees.

By looking at a map of Somerset county, it will be seen that west of the Kennebec, and between Dead and Moose rivers, there is a large extent of territory, comprising about twenty-five townships, considerably cut up with large streams, and well supplied by ponds, which may be called the heart of the lumber region of the county. Dr. Jackson's* account of some of the ponds in this section, follows: "Parlin Pond is three miles long, and is supplied by Boise's

*Third Annual Report on the Geology of the State of Maine, Augusta, 1839. See page 47.

Stream, which descends from Bald Mountain. There is a stream arising from this pond twelve miles in length, and communicates with Long Pond. There are numerous falls upon it, which Mr. Boise informs me amount, in all, to seventy feet fall. Logs are run down this stream to Long Pond. Attean Pond is eight miles west from Boise's, and is said to be from six to eight miles in length, and three miles wide. It empties into Holob Pond, and into Moose River above the bridge. Between Attean and Parlin Ponds, there is an abundance of large Norway pines, spruce and larch trees."*

Moose River is formed by numerous streams, near the western boundary of the county, and its whole course is a chain of ponds connected by the main river. Its course is first S.W. for twelve miles, where it forms a bend in No. 4, 7th Range, and enters Attean Pond, which is about eight miles long and three wide. A course of one mile N. carries its waters into Wood Pond, a sheet of water of nearly the same size and form as that of last mentioned. The course of the river is here changed to E., and in five miles, Long Pond makes a widening in the river for a distance of eight miles further. The shores of this lake are composed of flinty slate, greenstone, trap, and quartz rock. Ledges of argillaceous slate are also abundant. In the vicinity of this pond, cedars and pines are found in large numbers. The following statement of Dr. Jackson refers to land in the neighborhood of Long Pond. He writes: (Report III, p. 42,) "Mr. Coburn informs me that his lot lies between Long Pond and the Canada road; that it cost him two dollars per acre, and since he came into possession of it, he has cleared the wood from twenty-five acres, at the cost of twelve dollars per acre, or three hundred dollars. On the first year after clearing, he raised on the land, hay and grain, which he sold for six hundred dollars, and for two years following, he sold the produce for two hundred and fifty dollars per annum. Exclusive of the cost of cutting, his hay sold for twenty-five dollars per ton. The land, at the time we were there, was covered with oats and grass, which were in thriving condition. From this statement, it would appear that good investments may be made by clearing farms on this river." Proceeding east for eight miles—the river being sluggish and deep

*From this report I also learn an additional fact in regard to the Sugar Maple. Dr. Jackson writes that Mr. Boise makes his own sugar from the maple sap, and says that he obtains eight pounds of good sugar from a barrel of sap on the first tapping, while the next year, a barrel of sap gives nine pounds of sugar from the same trees. The quality of the juice increases from year to year, by tapping, while its quantity diminishes.—See page 48.

part of the distance, with rapids produced by the waters rushing over siliceous slate ledges, in which are veins of quartz for the remainder—we reach Brassua Lake, of which our author writes: "The shores are composed of graywacke slate, containing obscure remains of shells. Numerous boulders of greenstone trap also occur. The eastern shore is composed of granite rocks, and is covered with a dense growth of small poplar trees and white birch, which indicate a poor soil. Farther up the lake, we come to dense forests of cedar, spruce, birch, maple and pine trees, and the rocks are graywacke slate." Leaving this pond, Moose river pursues its course east for five miles, and empties its waters into Moose Head Lake.

A great part of the land upon Moose River is entirely worthless for farming purposes, but there are ridges, or swells of good land. Those who are well acquainted in this region, represent the forests as composed of a mixed growth of beech, pine, spruce and yellow birch, with an abundance of sugar maples, indicating a good soil, which, in places, is found to consist of a yellow loam upon a substratum of clay. The rocks are chiefly calciferous slate, stratified, running N.E. S.W. Speaking of the land around the settlement at Holden Township, Dr. Jackson, from whose reports I have made liberal extracts, says: "The soil at the Moose River settlement is generally good, and produces ample crops of wheat and other grain, the average yield of wheat being fifteen bushels to the acre, on un-manured uplands." This was written in 1838. Following a statement of some crops raised at No. 5, Range II, he remarks: * * "it is evident that the soil in this region is rich and well adapted to cultivation, and that profitable investments may be made by clearing and cultivating farms on the Canada road. The nature of the soil, as indicated by the forest trees, is evidently strong and good in many other parts of this section." * *

Away to the north of Range II, there are some thirty townships of land, embracing about a million acres of territory yet unsurveyed. But little is known at present, of the character of the soil, forest growth, or general appearance of this portion of the county. Doubtless much of the land is worthless, and a large part of the timber of but little value. What its resources are, remains to be told, and many years will pass before this is known.

It is during the winter season that this northern part of the county is most inhabited, and presents its greatest activity. In the vicinity of Moose Head Lake, upon the waters of Dead and

Moose River, and their tributary streams, the swamps are alive with lumbermen, who are engaged in cutting pine and spruce timber, which is hauled into the streams and rivers, and run or rafted to market. Lumbermen are now better cared for, and have more of the conveniences of living in a comfortable manner than in former years. They have good camps for lodging, good fare cooked by an experienced hand, and better wages than formerly. The prominent owners of timber lands have farms cleared, upon which hay and grain are cut for the purpose of feeding their teams in winter. A single company have land cleared in the vicinity of Moose Head Lake, upon which is obtained some five hundred tons of hay annually.

The great wealth of this portion of Somerset, consists in its extensive forests of the most valuable timber. This finds a market at all the mills upon the Kennebec, from Skowhegan to Bath. Some goes to other Atlantic cities, and indeed over the whole commercial world. As much as has been already consumed, there is an abundance left; so much so, that it is impossible to estimate the value or amount of what remains in this vast territory. Besides immense quantities of pine, there are spruce, hemlock, cedar, hackmetac, besides the growth of hard wood.

It is difficult to estimate the effect of lumbering upon agricultural pursuits. It forms a ready market at good prices, for most kinds of farm produce, and it also advances the price of labor. On the other hand, it has a tendency to create feelings of discontent in the minds of young men who are expecting large wages for this work in winter and spring, and as a consequence, they will not engage in farm labor.

Although the business gives employment to a large number of men, yet it does this but for a part of the year; while many who are employed in the swamps during the winter and spring, do but little for the remainder of the year. It may be safely inferred that a large capital invested in any enterprise other than farming, with equal risks, and a chance for large profit, will have a retarding influence upon agricultural operations.

I cannot better conclude this division of my subject than by giving place to the following remarks from a gentleman well acquainted with the subject, and at one time the editor of a prominent journal of our State. "All the lumber we get from Dead River and Moose Head Lake, comes in the form of mill logs run down the Kennebec to our river mills. This affords no outlet to half the mill logs

even that might be cut into boards, plank and timber on the ground, and sent by cars to market, which would double the amount that can never be otherwise reached; but this is far from being all. There are millions and millions of most beautiful pine lumber left on the ground, after the mere body of the tree has been cut out as a mill log, most suitable for various kinds of shorter dimension stuff, clapboards, shingles, &c., &c., that must lie and rot on the earth where it now is, unless some mode of conveyance can be provided, which will make it an object to go into those mutilated forests and erect machinery for cutting it into shape and preparing it for transportation. A rail road will settle up that whole country, establish mills in all directions, and bring out untold millions of dollars worth of most useful pine lumber, that must otherwise perish and be lost. We believe there is at this moment, waste lumber enough in the pine forests that have been operated upon by lumbermen who take thence nothing but the first cut, the straight, clear body of the tree, to pay for the building of a road from Skowhegan to the Forks."

VIII.—Concluding Remarks.

Having given an outline of the geography of Somerset county, with some notice of its geological characteristics, and remarks upon its staple products, fences, &c., I will conclude the present survey with a few hints touching obvious defects in the general management of the farmers, with one or two suggestions for improvement.

I. It is an evident fact that one of the principal defective features of the husbandry of the county, is, that farmers, as a general thing, have too much land under what is termed *cultivation*; and this is a fault clearly shown, not only in this county, but throughout the State. The practice, acquired by farmers in the first settlement of the county, of clearing land and cropping it as long as it would produce any thing at all, then abandoning it for that newly cleared, has led to serious results. When land did not produce a large crop, no effort was made to keep up its fertility by manuring, for new soil which could be had for the clearing was considered far better, and the plan of so doing preferable to the other practice. At present, upon many of our farms there is beginning to be a

want of wood and timber, while half cultivated fields are objects of common sight. There are some farmers who admit they are so situated that a part of their farms cannot be sold off to advantage. It is a question whether it would not be advisable to wholly neglect a part, or rather to pasture it to sheep, than attempt to till it in so thriftless a manner. This remark suggests to me another fault. This is in not keeping more sheep, instead, as now, of having so many horses. In one of the letters received as an answer to certain questions sent to different parts of the county last spring, the reply to the query, "what is the chief defect in the agriculture of your town?" was—"we have too many old horses." The writer then went on to say that most of the farmers in his town kept one or two horses, while others had three or four, (including colts.) Of those who had two horses, their flocks of sheep averaged from six to ten; while farmers who kept an extra horse or colt, the number of sheep in their flocks was less by from two to four than the above number. I do not propose to go into details, or give figures to show the value of horses as compared with sheep, nor to state the number of each in the different towns in the county, with other questions bearing upon the topic; for I have not space nor time, but leave it to be done by those who have an interest in it. It has occurred to me, however, that much of the land in the northern part of the county could be cleared, and sheep raising entered into with great chances of profit; even by farmers living in remote sections of the county. The mountain slopes would form good pasturage, and the interval lands afford rich opportunities for hay. As sheep husbandry is destined to become a leading pursuit of our farmers, this suggestion may be improved upon to advantage.

A large majority of our farmers are giving more attention to the making of manure than formerly; and this increased attention is the result of a greater need of it. But notwithstanding this, great negligence is manifested by some in regard to the making, preservation and use of farm manure. There is nothing more important to successful farming than manure, together with its judicious application, and a correct knowledge of the leading principles of agriculture; but it is a broad subject, and if followed, would lead me into too long an argument. I only wish to note one or two observations.

I cannot but call it a serious defect in our husbandry, that so large a number of farmers are yet careless and wasteful in the

management of manure. I have just written that a large proportion *are* devoting more attention to this subject of the preservation of their farm dressing—which is true. But we want to see ten manure sheds or cellars where we now see but one; and every farmer in the county saving and careful of the manurial resources of his estate, where there are now only here and there a few. That manure should be kept under cover, to protect it from the wasting influences of the air, sun, rain, &c., is a fact so evident that all good farmers have some means for its protection by one or the other of the above mentioned arrangements. Unless a shed or cellar specially adapted for the purpose of sheltering manure is provided, not only much of the value of the solid excrements of stock is lost, but all of the liquid portion, which is of equal or more importance than the solid. Dr. Dana, in his valuable treatise,* says that liquid manure contains, as solid dung does, water, mould and salts. The following table from his work, shows the composition of the urine of different animals. The mould is so small a part that its proportion is omitted:

	Water.	Salts.	Ammonia.
Cattle urine, per 100 lbs.,	92.62	3.38	4.00
Horse " " "	94.00	5.03	0.70
Sheep " " "	96.00	1.20	2.80
Hog " " "	92.60	1.76	5.64
Human " " "	95.75	1.88	2.36

The last column in the above table gives the chief value.

Dr. Dana, in remarking upon the comparative value of liquid and solid manure, says:—"In the first place, the principle which gives ammonia in urine runs at once, by putrefaction, into that state. It gives nothing else; whereas, in dung, the ammonia arises from a slower decay, and the principle which here affords ammonia may and without doubt does, from other products. Hence, we have a quick action with the liquid, a slower one with the solid. A second cause of the better effects of the liquid is, that it contains, besides its ammonia, a far greater amount of salts, and these give a more permanent effect. The amount of salts in human, cow and horse dung, is about one pound in every hundred; while the urine of the same animals contains nearly six pounds in every hundred."

It is not necessary for me to copy further to prove the value of

* An Essay on Manures: submitted to the Trustees of the Massachusetts Society for Promoting Agriculture. By Samuel L. Dana, N. Y. Saxton & Co. 1856. p. 29.

liquid manure. The above is enough to satisfy every farmer of its value, provided means are used to put the arguments into effect. For this purpose stables should be so constructed that the liquid voidings of stock can run into a gutter filled with dry loam, muck, leaves, &c., to absorb it. Until farmers pursue this plan, they cannot tell what a vast amount of manure can be saved, nor what a large amount is lost by the opposite practice. It is absolutely necessary to compost manure with dry muck or loam, if it is kept under cover. The quantity is largely increased by this method. How far our farmers can enter into the soiling system with profit, remains for each one to prove by trial.

I need not refer to *wastefulness* as a leading defect with farmers in carrying on their operations. It is every where seen. An intelligent farmer, residing in the western part of the county, recently stated to me that with all his care and attention, he had become satisfied that what was wasted upon his farm, amounted to a larger sum than what was saved—referring particularly to the single item of manure. The same gentleman said that from investigations and inquiries to considerable extent, he believed the agricultural wastes of his own town was not far from twenty thousand dollars annually! Another farmer, now considerably advanced in years, and who first settled in one of the towns on the Kennebec, says that when the land was new, and was being settled, no account was made of manure, and those who obtained settling lands near the river were considered more fortunate than others who were obliged to take up with farms further back, because they could put their manure into the river without hauling so far. He has stated to me that within the past sixty years, farmers have let their manure accumulate around their barns and stables to such an extent, that it was inconvenient approaching them; and when at length they were from necessity, driven to do something with it, it was either carted away in a huge pile to lie useless, or dumped into some convenient hollow or brook.

There is a waste of labor in going over in a superficial manner, a field intended for a certain crop, when by a more judicious and thorough system of cultivation, a return as large, or even larger, may be generally obtained from a field of considerably smaller size. There is often a large waste of fodder in the care of cattle, if not properly fed out; or by not having some simple machine to cut coarse fodder, to be mixed with meal; thus using all, both coarse and fine forage, to good account. In addition to this, a great

waste of time and capital is not unfrequently made by an injudicious course of farm management and culture; in attempting to grow crops not suited to the nature of the soil, or in pursuing one branch of farming when another would be better adapted for the situation and circumstances.

II. The drainage of low lands is one of the first improvements which I shall suggest. There are in this county, hundreds of acres of wet, rocky land, now entirely unfit for cultivation, which only needs to be drained, or ditched, to become the best land for grass and tillage in the county. Drainage may indeed be considered as forming the very foundation of all permanent improvements in the condition of tillage, or grass lands. Mr. Flint, in his work on "Grasses and Forage Plants," speaks of the benefit and value of drainage as follows. He regards it as especially "important for low, wet lands, since it not only frees them from superfluous water, thus making them more susceptible of tillage in early spring, but actually increases their temperature several degrees,—in some cases as much as from eight to ten, and rarely less than from two to four,—and admits the air to circulate more freely around the roots of plants. The aquatic grasses require large and constant supplies of moisture, and when the soil is changed by drainage, the more valuable species of grass may be introduced and cultivated in it."

Drainage has not been extensively practiced among farmers of the county, but I am confident it would pay a good return upon a liberal investment. A farmer who lives in the extreme southern part of the county, in giving me some account of his farm management, spoke of the results of ditching two acres of moist land, which had always been considered as nearly worthless. The soil was cold and stiff, and could not be worked in the spring until very late. Having decided to ditch the field, three drains were put through it, the main one at a depth of three and a half feet, the other less. Into these drains were put what rocks were gathered from the field, together with others from a field adjoining, and then covered over with loam. The expense of performing the job was twenty dollars; and although the drains were made five years ago, yet they are now in good condition. He summed up the advantages resulting from the job, as follows: "The land can be worked at least two weeks earlier in spring than before it was drained: the value of the field is largely increased; and whereas before, it was almost unfit for cultivation, now yields good crops of grass or Indian

corn ; the yield of grass per acre, never having been less than two tons." What has been done in one instance, can be done in others ; and if one farmer who has wet rocky land, finds it profitable to ditch or drain, why cannot another who has soil of a similar character also make the operation pay ?

A judicious system of rotation of crops is much needed ; and this rotation must be particularly adapted for each separate district, special reference being given to the market, nature of the soil, &c. As these differ widely in various sections of the county, it is not to be supposed that each farmer can pursue the same course. Every plant grown, exhausts certain constituents of the soil, and by continued cropping, the most fertile land will in a very short time become worn out and unproductive. There is no doubt but what any one crop can be grown for almost any number of years in succession, if enough is applied to the soil to have it always in a proper condition. But the question is, whether frequent change of crops would not be advisable, rather than to expend a large amount in growing the same kind of plants continually. In speaking of the advantages of, and reasons for, a system of rotation, Prof. S. W. Johnson says* : " When a light virgin soil comes under the hand of the farmer, it yields good crops for a few years, but then subsides to a low state of productiveness. At first it may have yielded wheat. When no longer able to support that crop, it may still give fair crops of barley. The next year, if put to turnips or potatoes, it may seem to recover its fertility somewhat, and produce a good burden of roots ; but now it will not yield again a good crop of wheat, though probably clover would flourish on it. The causes of such facts lie partly in the soil, and partly in the plants themselves."

The rules to be followed in pursuing a rotation of crops, are thus stated in an article upon this subject in the Patent Office Agricultural Report for 1850, p. 126 : 1. To exhaust the soil the least that can be done. 2. Restore back to the soil as much manure as practicable. 3. Take that course which will best prepare the field for a future crop. 4. Prevent, as far as possible, the growth of weeds and the increase of insects. 5. Adapt the application of manure to the respective requirements of the different crops which are to follow. 6. Select the several crops so as to adapt them to soil, climate, and market.

From observation, I am inclined to believe that one of the two

*In an article on " Agricultural Chemistry," in the New American Cyclopædia.

courses of rotation mentioned below, will be found to meet the wants of the farmers of Somerset; at the same time there will be less danger of impairing the fertility of their fields than by the present modes. 1. First year, corn, with the land well dressed; second year, wheat or barley; third year, grass, clover and timothy. 2. First year, potatoes, manured; second year, corn, well manured; third year, barley; fourth, clover and timothy, from two to three years.

Many farmers living in the older towns of the county, will, from necessity, be obliged to devote considerable attention to the renovation of old lands, and in keeping up their fertility. This can be done in several ways, and I shall do no more than simply mention two or three methods. 1. By plowing under green crops, such as clover, buckwheat, &c. If land is much exhausted, and the farmer has not animal manure to dress it with, buckwheat or clover can be sown and plowed under, and this course followed for two or three years, will be found to vastly improve its character and fertility. 2. The use of artificial manures, will, in many cases, be found of great advantage. Farmers who experiment upon a limited scale, in the use of ashes, lime, salt, and gypsum, will, by this manner, find out the value of such manures for their own farms. 3. Much can be done towards improving the texture of soils by mixing them. Thus a heavy clay soil is improved by the use of sand or loam, which serves to make it lighter and more porous. On the other hand, light, sandy soils, are greatly benefited by any substance which makes them more compact and solid, such as clay, muck, &c. The late Prof. Norton, in his "Elements of Scientific Agriculture," p. 60, says: "In situations where clay can be obtained, it is found to be the most valuable application for light soils, possible. It consolidates them, causes them to retain water and manure, and for objects of permanent improvement is worth more, load for load, than manure." 4. In all cases it is highly necessary that the farmer should be acquainted with the cause of the barrenness of his soil, before attempting to renovate it.

The diffusion of information of a practical and scientific nature, among farmers, is one of the surest plans for improvement which can be thought of. This is being done by the multiplicity of books upon agriculture in all its branches; through our farming periodicals; and in the establishment of Farmers' clubs. It is the dissemination of this sort of knowledge which ultimately leads to all true and real improvements.

Farm journals and accounts are not generally kept, and in this,

improvement is much needed. Every practical and systematic farmer should keep a journal of his farm, with an account of all the operations upon it, a careful record of his experiments, however limited; facts and items in connection with rural economy; reports of failures as well as successes with certain crops; notes of the weather in winter and summer, with dates showing the flowering and leaving out of the more common trees and shrubs, and also of the appearance and disappearance of birds, insects, &c.; cost of farm labor, with all other matters connected with his business. If these records or journals were more carefully kept, they would not only form a complete guide for the farmer in carrying on his estate, but they would be found of value in furnishing important materials for our agricultural journals, or even for such a work as the present.

I have now gone over, in brief, the plan proposed at the commencement of this Survey. Whatever faults of style may be found upon its pages, I wish passed over. If any errors have occurred in connection with any statement of facts regarding the growth, management and yield of certain crops, &c., I wish them corrected.

South Norridgewock, Dec. 18, 1860.

METEOROLOGICAL.

Abstract of Meteorological Observations made at Belfast, Maine, for the meteorological year ending December 1, 1860.

GEORGE E. BRACKETT, *Observer.*

	Latitude 44 deg. 23 min. N. Longitude 69 deg. 8 min. W.	Dec.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Annual Results.
Thermometer	Monthly mean,	15.2	20.0	18.5	38.5	41.4	55 6	63.2	67.3	67.4	55.6	45.5	39.4	43.9 deg. annual mean.
	Highest degree,	50	42	46	56	62	80	86	82	84	77	63	67	86 highest deg. during the year.
	Lowest degree,	—16	—15	—16	19	17	36	42	50	55	28	29	16	—16 lowest " " "
	Range,	66	57	62	37	45	44	44	22	29	49	34	51	66 greatest monthly range.
	Warmest day,	7	8	23	31	23	12	30	3	5	6	11	1	3d July warmest day of year.
	Coldest day,	28	2	1	5	2	1	20	23	20	30	28	25	1st February coldest day of year.
Winds.	North,	16	5	8	3	10	5	1	7	3	3	5	8	74 days N wind during year.
	Northeast,	0	1	0	2	0	3	5	1	5	1	4	3	25 " N E " "
	East,	3	1	2	3	1	2	2	0	3	1	3	1	22 " E " "
	Southeast,	0	1	0	1	0	1	1	2	1	0	2	0	9 " S E " "
	South,	2	2	6	2	4	4	1	5	4	7	7	6	50 " S " "
	Southwest,	0	5	6	14	4	8	12	10	9	7	2	2	79 " S W " "
	West,	10	11	2	2	3	2	0	4	5	8	5	6	58 " W " "
	Northwest,	0	5	5	4	8	6	8	2	1	3	3	4	49 " N W " "
	Prevailing winds,	N	W	N	S W	N	S W	S W	S W	S W	W	S	N	S W prevailing during the year.
Weather.	Fair days,	19	26	24	28	30	30	28	29	27	25	24	23	311 fair days.
	Overcast days,	12	5	5	3	0	1	2	2	4	5	7	7	53 overcast days.
	Rain,	1	5	3	5	7	7	9	9	11	9	14	8	88 days on which rain fell.
	Snow,	12	7	6	5	2	0	0	0	0	0	0	3	35 days on which snow fell.
	Rain and snow,	0	0	0	2	1	0	0	0	0	0	0	1	4 days on which rain & snow fell.
Total of each month,		31	31	29	31	30	31	30	31	31	30	31	30	366 total.

REMARKS.—Observations made regularly three times a day. The degrees preceded by the dash signify that the temperature is below 0 ; (thus —16) reads 16 degrees below 0.—[Fahrenheit's Thermometer.]

CASUAL AND PERIODICAL PHENOMENA, ETC.

December, 1859. Lunar halo at 7 P. M. of 3d; shooting star in W. at 11 P. M. of 21st; amount of snow fall during the month, 42 inches; good sleighing during the month.

January, 1860. Parhelia at 3½ P. M. of 3d; flashes of lightning at 9 P. M. of 22d; amount of snow fall for month, 7½ inches.

February. Penobscot bay froze over night of 1st; lunar halo from 8 P. M. until midnight, ring large and bright; 4th, ditto at 9 P. M.; white frost night of 8th; aurora, very bright night of 21st; solar halo, A. M. of 28th; depth of snow fall for month, 10 inches.

March. Heavy white frost 15th, 16th and 17th; sleighing ended 16th; first robin seen, 19th; depth of snow fall for month, 12 inches.

April. First note of frogs, 12th; shooting stars at 8 P. M. of 13th; first barn swallows, 20th; solar halo at 2 P. M. of 20th; parhelia A. M. of 20th.

May. Whirlwind, 6th; distant thunder, 13th; apple trees in blossom, 24th; solar halo at noon of 27th.

June. Thunder showers in W., P. M. of 14th; heavy gale, 30th.

July. Thunder shower in W. at 7 P. M. of 13th; whirlwind, P. M. of 16th; rainbow, full arch, at 6 P. M., 21st; slight frost in sheltered situations morning of 28th.

August. 3d, drouth, crops and pasturage suffering for rain; 6th 87 deg. at 3 P. M.; 9th, thunder shower at 6 A. M. This was the first thunder shower since August 31st, 1859, a period of one year lacking twenty days. 21st, thunder showers at 6 and 10 P. M., heavy; 28th, thunder showers in night; 31st, potatoes killed by rust.

September. Light frost in low ground night of 2d; slight fall of hail at 1 P. M. of 9th; white frost on 9th; killing frost night of 23d and 27th; ground froze night of 28th; frost, 30th; water congealed night of 28th, first time for season.

October. Solar halo at 9 A. M. of 1st; snow squall at 9½ P. M. of 6th; slight fall of hail eve of 14th; heavy shock of earthquake at 6 A. M. of 17th; very heavy thunder shower at 4 and 5 P. M. of 26th; ground froze night of 27th.

November. 2½ P. M. 69 deg.; lunar halo 5 A. M. of 6th; grass hoppers abundant and lively on 9th; ground froze first time for month night of 15th; heavy snow squall at 6 A. M. of 21st; ground closed night of 21th; no sleighing during the month.

GEORGE E. BRACKETT, *Obs.*

BELFAST, 1860.

Meteorological observations at Perry, Washington County.
WILLIAM D. DANA, *Observer.*

Months.	Mean temperature.	Highest.	Lowest.	Inches of rain and melted snow.	No. days on which snow or rain fell.
January,	21.61	43	–9	2.07	9
February,	20	39	24	2.58	6
March,	33.10	54	15	5.36	12
April,	37.56	60	8	2.83	10
May,	51.39	84	28	1.26	4
June,	57.27	86	40	6.87	10
July,	62.37	78.5	49	2.12	10
August,	63.18	76	52	7.57	10
September,	55.15	78	26	5.27	9
October,	45.58	62	23	2.96	11
November,	44	65	18	1.43	3
					To Nov. 3d

THE BAROMETER A VALUABLE INSTRUMENT FOR FARMERS.

The barometer is an instrument designed to indicate the weight or density of the atmosphere. Its principle was first discovered by Torricelli in 1643. In its early form, and the usual one until a recent period, it consisted of a glass tube, known as the Torricellian tube, about thirty-three inches long, closed at one end and filled with mercury. It is then inverted, and its lower end placed in a cup, bag, or other recepticle of the same material. Upon being thus inverted, the mercury produces a vacuum at the top by its weight, leaving a column about thirty inches high at the sea level, and less in proportion as the place is more elevated. The hight at which the mercury stands indicates the pressure of the air.

Experience has shown that the column falls before the approach of a storm, and rises before fair weather. Hence this instrument

is of great value to the sailor upon the ocean, and few or no ships sail without being provided with one. It is also of exceeding value to the farmer, especially in haying and harvesting time. But there are serious objections to the mercurial barometer for farmers' use, which have prevented its general introduction. One of these is its cost, growing out of the great care necessary in its manufacture, to render it perfect, in depriving the column of every particle of air, which is done by boiling the mercury in the tube, and by other means involving considerable labor and expense. Inferior instruments are sold as low as seven to ten dollars, but reliable standard instruments sell for a much higher price. Other objections are its liability to break and to get out of order.

Recently, another form of the instrument has been invented, which in many respects is much preferable, and is known as the Aneroid Barometer. The name is significant of the formation of a vacuum without a fluid, and the form of this barometer is greatly in contrast with the Torricellian tube. The principle on which this instrument operates seems to have been first noticed by M. Conte, a French professor, but was finally reduced by M. Vidi. At the New Haven agricultural lectures, in February last, Prof. Silliman, Jr., devoted an hour or two to the subject of Meteorology, in which he described the various forms of this instrument. Of the Aneroid barometer, which he deemed the most important instrument that could be placed in the hands of the farmer, he said: "Unqualifiedly it is the best for the farmer's use; and for the scientific man, its portability, and almost total unliability to accident, strongly recommend it. The old mercurial barometer, with its marks of 'cloudy,' 'rain,' 'fair weather,' &c., is utterly unreliable; for the pressure of the atmosphere at divers hights is different, and the pressure that near New York rises to 'fair weather,' would at a higher place, say the prairies, stand at 'foul.' And then, again, if roughly handled, air will leak into the instrument, and its value be utterly destroyed. The 'Aneroid' barometer (or the 'without fluid' barometer) was first invented by M. Conte, a professor at the Ærostatical School at Meudon, near Paris, but a Yankee mechanic, Mr. Edwin Kendall, at New Lebanon Springs, N. Y., has made it much cheaper, and equally reliable as the expensive French instrument." He sells it for the moderate price of ten dollars,* only one-third the cost of a Smithsonian barometer. The Aneroid consists of a flat and circular

*While the above is in press, (Dec. 8th) I am advised by Mr. Kendall that he has reduced the price to $7.50.

metallic box, the cover of which is very thin, and corrugated, or in ridges and furrows, concentric with the walls. The air is exhausted from this box, which is then hermetically sealed. The rusult is, that the elastic cover rises and falls with every change in atmospheric pressure. By means of a combination of levers and springs, these movements are communicated from the center of the cover to a pointer which moves over the graduated face of the dial, on which inches and hundredths are inscribed, which correspond with the hight of the column in the mercurial instrument. The whole apparatus is incased in a brass box, about four inches in diameter and two inches deep, covered with a front glass, and resembling in general appearance a chronometer case."

Having tested Mr. Kendall's barometer to my own entire satisfaction, and knowing others who have also done so, and being repeatedly assured that they have often saved their cost in a single haying season, I give it a hearty commendation, and take this method to introduce it more generally to the notice of Maine farmers. None should, however, expect that as a weather prophet the barometer will be found of unerring accuracy and exactness, for no infallible means of predicting approaching changes have yet been discovered. The state of the weather depends upon various conditions, of which the weight or density of the atmosphere is but one—the amount of moisture contained in it, is another; temperature is a third, electrical changes a fourth, and so on. Then again, local causes have much to do with the weather in any given locality. But in connection with the ordinary appearances in nature, which all persons more or less observe, and which from time immemorial have been recognized as indicating changes, the barometer renders exceedingly valuable assistance in judging, and the more so that its testimony touches a point which we have no other means of ascertaining; (i. e., the density of the atmosphere at the time.)

As before remarked, the average hight of the barometer at the sea level, is about thirty inches. As we ascend from this level the mercury falls, for the simple reason that we leave a portion of the atmosphere beneath us, and of course there is less weight above. Every hundred feet we rise, the column falls about a tenth of an inch, so that it is no particular hight which indicates either fair or foul weather, *but we judge only by the changes.*

Prof. Silliman gives the following rules which embody the results of long and various experience in different places.

"1. When the mercury is very low, high winds and storms are likely to prevail.

2. Generally, the rising of the mercury indicates the approach of fair weather; and its falling shows the approach of foul weather.

3. In sultry weather the falling of the mercury indicates thunder. In winter its rise indicates frost. In frosty weather its fall indicates thaw, and its rise indicates snow.

4. Whatever change of weather suddenly follows a change in the barometer, may be expected to last but a short time.

5. When the barometer alters slowly, a long succession of foul weather may be expected, if the column falls, or of fair weather if it rises.

6. A fluctuating and unsettled state of the barometer, indicates changeable weather.

In the above rules the *index hand of the Aneroid* answers to the *mercury column* of the old barometer."

Mr. Kendall furnishes the following rules:

"1st. There is no point at which the barometer must stand to indicate rain or wind.

2d. The judgment must be governed by the rising or falling of the barometer.

3d. The falling of the barometer indicates the approach of a storm, the extent of which will be proportionate to the amount and rapidity of the fall.

4th. Showers. The barometer falls previously from four to twelve hundredths of an inch, varying in time, from one to three hours. The greater and more rapid the fall, the more violent will be the shower, accompanied more or less with wind.

5th. Northeasterly storms. The barometer falls previously from four to eight-tenths of an inch, varying in time from one to four hours, and continues falling until the storm arrives at its crisis, when the barometer begins to rise and continues rising until that part of the storm which comes from the N. W. passes off.

6th. Southerly storms. The barometer falls previously from one to four-tenths of an inch, varying in time from six to twelve hours. These storms generally precede unsettled weather; at such times the barometer continues low, and very slight additional depressions are followed by rain.

A southerly storm is perhaps the most difficult to judge of by appearances, as they change so frequently without any real change in the atmosphere. During this class of storms, the utmost confi-

dence should be placed in the barometer. After the first indication as above, and the barometer does not rise, but remains stationary, it is strong indication that the storm has not all passed.

The foregoing rules are the result of long and careful observation. It must be remembered that storms occur under different circumstances in different parts of the globe, yet taking the first three of the above rules as a basis of calculation, a short experience, with the exercise of the judgment, will enable one to determine very correctly concerning approaching changes in the weather."

The mercurial barometer has long been used for the measurement of altitudes, but the Aneroid, at once so easily and safely portable, can be used with great facility and with such accuracy as to offer the most expeditious and best method of ascertaining the elevation of hills or mountains. For this purpose the starting point should be the sea level, or any point above it whose hight is known. The instrument should be kept as near as may be at the same temperature, or if this is not practicable, a proper allowance should be made for variations.

If only one is used, a time should be selected when the air is still and not affected by disturbing causes, as a change of density or of temeperature would indicate an elevation greater or less than the true one. A nearer approximation to accuracy could be made by using two which had been compared; the stationary one should be observed every hour, while the other is used in the ascent.

The following table of elevations has been computed, answering to the corresponding depressions of the barometer.* The sea level being assumed as at 30 inches, and the temperature at 55 deg.

Hight of the Barometer.	Feet.	Hight of the Barometer.	Feet.	Hight of the Barometer.	Feet.
30.0	–	28.6	1,315	27.2	2,692
29.9	92	28.5	1,411	27 1	2,793
29.8	184	28.4	1,508	27.0	2,895
29.7	276	28.3	1,605	26.9	2,997
29 6	368	28.2	1,702	26.8	3,099
29.5	462	28.1	1,799	26.7	3,201
29.4	556	28.0	1,897	26.6	3,304
29.3	650	27.9	1,996	26.5	3,406
29.2	744	27.8	2,095	26.4	3,511
29.1	838	27.7	2,194	26.3	3,615
29.0	933	27.6	2,293	26.2	3,719
28.9	1,028	27.5	2,392	26.1	3,824
28.8	1,123	27.4	2,491	26.0	3,926
28.7	1,219	27.3	2,592	25.0	5,000

* Manual of the Barometer, by J. H. Bellville.

On Cotton Seed Meal as Cattle Food.

At a time like the present, following an unusually short crop of the chief agricultural product of the State, and when pressing need is felt of the utmost economy in the use of hay, and of the substitution to an unusual extent of other foods in its place, any contribution of knowledge regarding these, will be doubly welcome. In my report for 1858, mention was made of oil cake as a cattle food, and an extract was given from a then recent report by Prof. S. W. Johnson, of Yale College, regarding cotton seed oil cake and meal, prepared by a process recently invented for hulling the seeds of cotton preparatory to the extraction of oil, as practiced by the Union Oil Co., of Providence, R. I. After presure, the cake is ground into meal and used as a cattle food. In another paper on the same subject, by Prof. Johnson, he says:

"Respecting the sample of cotton seed cake received from you, for chemical examination, I have the honor to report, that its composition is not inferior to that of the best linseed cake, and, in some points, its agricultural value surpasses that of any other kind of oil cake of which I have knowledge, as will appear from the following statement of its composition, compared with that of linseed cake:

	Cotton.	Linseed.
Water,	6.82	9.23
Oil,	16.47	12.96
Albuminous bodies,	44.41	28.28
Mucilaginous and Saccharine Matters,	12.74	34.22
Fibre,	11.76	9.00
Ash,	7.80	6.31
	100.00	100.00
Nitrogen,	7.05	4.47
Phosphoric Acid in Ash,	2.36	
Sand,	.94	

"On comparing the analysis with the linseed cake, it will be seen that the cotton seed cake is much richer in oil and albuminous matter than the linseed cake. A correspondingly less quantity will, therefore, be required. Three pounds of this cotton seed cake are equivalent to four of linseed cake, of average quality. The dung of cattle, &c., fed upon this article, will be greatly richer, both in nitrogen and phosphates than that of animals fed on hay alone. Where stock is kept, probably the best way of using

this cake as a fertilizer, is to feed it to the cattle and carefully apply the manure they furnish. In this way, whatever is not economized in fat or flesh, will be available as manure."

During three winters past I have used this article, and have also made careful inquiries and observations regarding its use by others, and I feel fully warranted in recommending it for cattle, and especially for milch cows, as the cheapest and best food in the market. It is found to increase the flow of milk considerably beyond an equal weight of Indian corn or any other grain, the animal at the same time improving in condition. It is already used in the State to some extent, but deserves to be more generally known. The price at the present time at the manufactory in Providence, is $26.50 per ton of 2,000 pounds, in quantities of a ton or over. At our sea ports its cost may be a trifle over one and a half cents per pound. Several instances have come to my knowledge where complaint has been made either of injury to animals fed upon it, or to the flavor of their milk, but none which attached to the article prepared at Providence—nor to a good article prepared elsewhere. Some cotton cake has been brought from the South or West, which is of inferior quality, either from imperfection or error in the manufacture, and some has been seriously injured by dampness and consequent mouldiness.

Cotton seed cake deserves regard not less for its fertilizing than for its nutritive properties. From the results of careful research, it appears that this article returns a large proportion of its cost in the manure yielded from its consumption.

Mr. Harris, editor of the Genessee Farmer, a friend and former pupil of Mr. Lawes of Rothampstead, England, whose very careful and extensive experimental researches are widely and favorably known, has furnished an instructive and suggestive article, in which the comparative fertilizing properties of different articles of food are set forth, from which we quote as follows:

"People talk of horse, or cow, or sheep, or hog, or hen manure, as if these manures had a fixed value, irrespective of the food consumed by these different animals.

The animal exercises very little influence on the manure.

If the liquid and solid excrements were *all saved*, they would be as valuable when obtained from a horse as from a hen, *if the food consumed was the same.*

In England, where farmers purchase large quantities of food for feeding to animals on the farm, this fact is beginning to be appreci-

ated. Mr. Lawes, than whom there is no better authority, has recently published a table "showing the estimated value of the manure obtained from the consumption of one ton of different articles of food; each supposed to be of good quality of its kind." We have reduced the gross ton to our common ton of 2000 lbs., and given the price in dollars and cents. The following is the table:

1.	Decorticated Cotton-seed Cake,	$27 86
2.	Rape Cake,	21 01
3.	Linseed Cake,	19 72
4.	Malt-dust,	18 21
5.	Lentils,	16 51
6.	Linseed,	15 65
7.	Tares,	15 75
8.	Beans,	15 75
9.	Peas,	13 38
10.	Locust Beans,	4 81
11.	Oats,	7 40
12.	Wheat,	7 08
13.	Indian Corn,	6 65
14.	Malt,	6 65
15.	Barley,	6 32
16.	Clover Hay,	9 64
17.	Meadow Hay, (upland,)	6 43
18.	Oat Straw,	2 90
19.	Wheat Straw,	2 68
20.	Barley straw,	2 25
21.	Potatoes,	1 50
22.	Mangolds,	1 07
23.	Swedish Turnips,	91
24.	Common Turnips,	86
25.	Carrots,	86

Mr. Lawes has been engaged for many years in experiments on this subject, and we have no doubt that the table correctly states the *relative* value of the manures obtained from the different foods; that is to say, *if* the manure obtained from the consumption of a ton of hay is worth $6.43, that made from a ton of clover hay is worth $9.64, or half as much again—and this is true everywhere. The estimates are on the value of manure in England, and are undoubtedly correct; but of course the figures are only true *relatively* where manures of all kinds are of less value, as is the case in the newer sections of this country. In the vicinity of this city, manures are quite as high as in England, and here the estimates may be adopted without any qualification; and the same is true of a great portion of New England, and nearly if not quite, through-

out the Atlantic slope, where the use of guano or other artificial fertilizers is profitable.

"But is it true," we hear it asked, "that the manure made from one ton of clover hay is worth as much as that made from a ton and a half of timothy or meadow hay?" There is no doubt on this point; and it is a fact we have often mentioned. It is one reason why we so repeatedly urge the importance of an increased growth of clover as a means of enriching the soil. But in addition to this, it is also true that clover does not impoverish the soil so much as timothy or other grasses when both are consumed on the farm. If both the clover and the timothy are sold off the farm, the clover *may* impoverish the soil as much as the timothy, though there is some doubt on this point."

Notes on some of the newer Grapes.

In my report for 1857, were some remarks on several recently introduced grapes. Three seasons having elapsed since then, which have added materially to our stock of information, I propose now, in response to repeated requests to do so, to state the results of experience during these years. That grapes can be grown and ripened in the open air in our State, from Kittery Point to Calais, has been demonstrated. A luxury so great and so healthful is worth the expenditure of considerable care and expense.

The principal requisites to success in grape culture, are a rich, deep, warm, dry soil, overlying a porous subsoil, or else thoroughly drained, a warm exposure, shelter from cold winds, judicious pruning and a severe thinning out of fruit, leaving one bunch only on a shoot, or two of the smaller growing varieties on old well established vines. The vines should be laid down in winter and covered with evergreens. If hardy they will survive without this, but with it they start stronger and ripen earlier, which is a great object and well worth the additional labor. I said a rich soil, but it should not be filled, as some practice, with carrion or other very strong manure, as this induces a late, rank, unripe growth, and a thoroughly ripened growth of wood is indispensable.

During the past season the writer raised grapes upon a clayey soil naturally wet and cold, but underdrained, in the most open

kind of culture possible—i. e. trained to stakes in the open field; having to contend also with a frost in June, which killed the first set of shoots which pushed from the vines, (a very rare occurrence in Maine,) which received all the first premiums awarded by the State Agricultural Society at its exhibition, for grapes in open culture, viz.: for the best single variety, (the Delaware:) for the best three varieties and for the best six varieties; this shows what can be done even under very unfavorable circumstances, but such conditions involve a necessity for much greater care and skill in management than where the soil and exposure are favorable. Of between sixty and seventy varieties under cultivation, some of which were finally rejected the past season, and others have not yet borne fruit, the following are noticed:

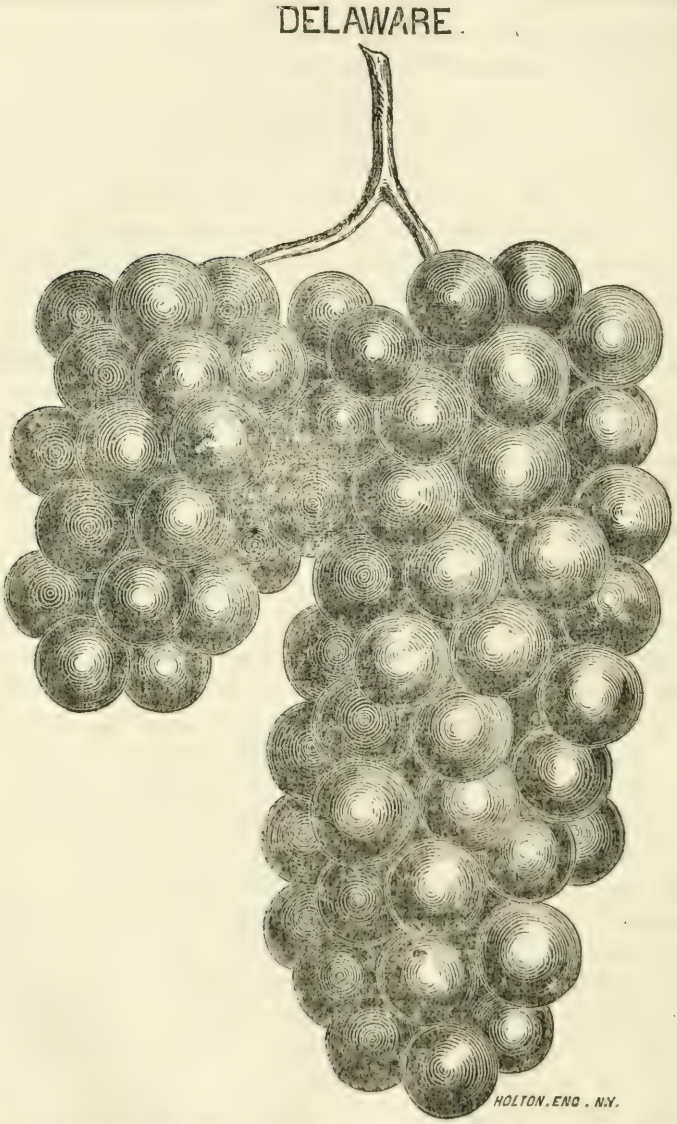
Hartford Prolific. This is one of the best market varieties, being of fair quality, ripening very early, the vine vigorous and productive. Its principal fault is that it bears too much, and requires more thinning out of fruit than most others. The bunches are large, and the flavor vinous, rather than sweet. When grown much in the shade, the berries are apt to drop when ripe; but this is not the case with bunches well exposed to the sun. It is one of the few varieties with which it is advisable for this reason to have the bunches thus exposed.

Concord. This ripens well in many situations, but in others proves rather too late. When well ripened, it is of very good quality. Bunches large and very handsome. The vine is hardy.

Diana. A vigorous grower and good bearer, the bunches of medium size, the fruit of delicious quality. Needs a warm situation, and warm, dry soil, and careful protection. In some seasons, it is liable to the rot.

Delaware. This was spoken of in the report above referred to, as promising to take a very high rank. The three years experience since, shows that it has fully redeemed that promise, and it now ranks as decidedly the best grape for open culture which has been proved. My earliest planted vines have borne four years, and each

year the fruit has been improved in size, quality, and earliness of ripening.



In consequence of the unprecedented demand for vines of this sort, many have been sold, not only so small as to be scarcely larger than a spear of red top, but very feeble also, and hence an impression prevails among many, that the vine is naturally of feeble

growth. But such is not the case; for when strong vines are planted and once established, a growth of ten, fifteen, or even twenty feet upon the shoots, of a season, is not uncommon. Dr. C. W. Grant, of Iona Island, (in the Hudson,) who has grown this variety more extensively than any other person, and to whom I am indebted for the accompanying engraving, says that feeble growth is but an accident, and vigorous, healthy growth, under favorable circumstances, the universal law. He farther says:

"Its compact, symmetric bunches, of convenient size, fine wine color, and translucency constitute a grape of exceeding beauty, which as an ornament for the table is unequalled.

It is very juicy, and its juice is wine—rich, sugary, and spicy, with a fine delicate aroma, suggestive of the Red Frontignac, and surpassing that excellent variety in its brisk, pure, vinous flavor."

Mr. Charles Downing, speaking of it, says: "Although the Delaware was highly prized and warmly commended by me from my first acquaintance with it, I have until recently maintained preference for my old favorite, the sweet, luscious Black Hamburg. But to the pure, rich, sugary wine of the Delaware, as it now grows with us, I must concede my preference. It constantly grows upon my liking, and when I consider all its excellencies, regarding its fine, healthy, vigorous habit, as well as quality of fruit, I can scarcely speak of it in measured terms of praise."

Rebecca. This, in quality, compares favorably even with choice foreign sorts, and has, in favorable locations and dry, warm soils, succeeded well, and given the highest satisfaction. In my heavy, wet soil, it has been very difficult to secure sufficiently well ripened wood. It is probably a seedling of the Sweetwater, or some similar foreign sort, and like that, it is a moderate grower, and requires careful protection in winter. Where it succeeds, there is none better. Under favorable conditions of soil, &c., I have grown it to perfection, and it proves quite early.

Clinton. Hardy, productive and good. It colors early, but should hang late, as it is harsh to the taste at first, but afterwards improves much, becoming vinous and rich.

Blood's Seedlings. The white and the black both grow well, ripen early, and the vine is hardy. The fruit of both is of ordinary quality; the white the best, and nearly or quite as good as Northern Muscadine, which it resembles. Skin thick, pulp firm and of foxy flavor. They both blight some—the black the most.

Union Village. Bunches exceedingly large and handsome.

Rather earlier than the Isabella; the vine a prodigious grower, but fails to ripen its wood so as to endure the winter. It might succeed under very favorable conditions.

Canby's August. A hardy prolific vine. Fruit earlier than the Isabella, bunches and berries of medium size, and of good quality.

Logan. Very hardy, and productive. Fruit nearly as large as Isabella, of very good quality and one of the earliest.

Garrigues. The vine resembles, in vigor of growth and general appearance, the Isabella, and the fruit also resembles it, but it is considerably earlier, and the vine hardier.

Isabella. I notice this only because it is already disseminated through the State more than any other, and to say that I never have been able to ripen it. In favorable seasons, the fruit colors, and many suppose it ripe; but in Maine it never attains the excellence which a longer season would give it.

Northern Muscadine. A native Fox grape, introduced by the Shakers, and one of the best of its class, being very sweet, early, hardy and productive. Its foxy flavor, so repugnant to some, is a recommendation to others. Its chief faults, other than this, are firmness of pulp and its habit of falling from the bunch as soon as ripe.

The Franklin, commended as very early and good, the Anna, a delicious white grape, the Early Hudson, North America, and perhaps a dozen others, give promise of being worthy cultivation, but have not yet been sufficiently tested to speak with confidence of their relative merits.

The method of pruning for out-door vines in this climate found most satisfactory, is that called spur pruning. In order to train and prune a vine right and easily, it is absolutely necessary to commence right, and for three or four years to go on right, after which there is no difficulty in always having the vine in good shape, productive, and the pruning will be as easy as to whittle a shingle; nor is there any *difficulty* in the first years if we understand what is wanted, and keep a proper plan in view. When the vine is planted, let it be cut down to three or four buds; when these have grown six or eight inches, select the best one and pinch off the others. Let the one reserved grow all it will during the season, the object now being to get as much root as possible, and the root will be in proportion to the top. In the fall, after the leaves drop, cut down the vine to three or four buds, and cover for the winter. The second year let two shoots grow, and two only; tie them up

carefully from time to time, pinching in the laterals at one bud, and stop the main shoots as early as the first of September, to enable them better to ripen their wood. If these shoots get ten or twelve feet growth this year, they may be shortened in the fall to six feet, and then be laid down and covered again for the winter. Next spring these two shoots are to be tied out horizontally, and four shoots allowed to grow upright from them, each four feet from the other. Let nothing else grow, rubbing off all others which start, besides these four, and pinch in the laterals as before, and stop the main shoots by the last of August, in order to ripen their wood. In the fall these may be shortened to two feet each. Next year they may be allowed to bear fruit—not more than a bunch on each shoot which proceeds from the buds on last year's wood: the upper shoot to be trained upright and allowed to grow three or four feet. When the side shoots have grown two feet, pinch their ends and keep the laterals pinched in also—thus will the whole space be filled and no undue crowding of foliage be allowed. Next fall, and each year after, all the pruning necessary is to cut back the bearing shoots to one good bud, thus leaving a *spur* for fruiting the succeeding year. The upright shoots may be extended one or two feet each year until as high as the wall or trellis, or as high as wanted, and in after years, if needful or advisable, the vine may be extended in width by training shoots from the ends horizontally, and taking other upright ones from them in the same manner as at first. A very little cutting *properly done*, a little labor bestowed *at the right time* in rubbing off useless shoots, tying up such as are to be saved, pinching in such as have grown enough, or are robbing other portions of the strength due them, &c., will cause a vine to be a thing of beauty and a joy constantly; but neglect it in its early years, and, like an untrained child, it may not be expected to become what it might with fitting treatment.

Another mode of pruning called the *renewal system* is practised with tolerable success. It differs from the above only in that, after the third year, new upright canes are annually substituted for those which, as above stated, are *spur pruned and left to remain permanently*. The following cuts will illustrate both plans:

Fig. 1, represents the vine as cut back when first planted out. After a season's growth it is again cut back in the fall to within about two inches of where it started, and then presents an appearance *very* similar to what it did at planting.

Fig. 2, represents the growth at the end of the second season. These upright shoots are now to be shortened in autumn more or less, according to their strength, and in spring, tied out horizontally.

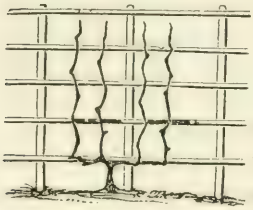


Fig. 3 represents the growth at the end of the third year. In the fall the only pruning necessary is to shorten back the upright canes.

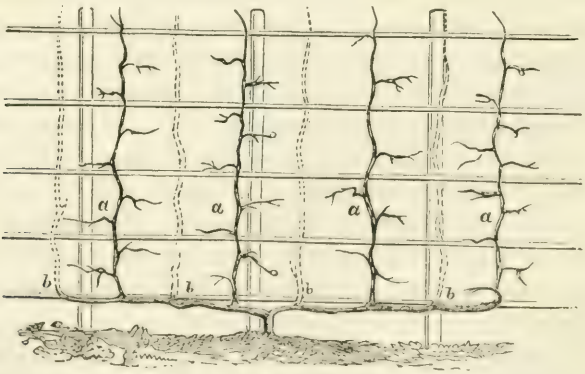


Fig. 4, represents a full grown vine, trained on the renewal system. The dark shoots are the present year's bearers : the dotted ones those growing this year for bearing next. In the fall those which bear this year are cut out, leaving a good bud or two at the bottom from which to grow a cane next year for bearing the year after. Omit the dotted lines and it represents a vine ready for spur pruning in autumn, by shortening the bearing side branches.

FIG. 5.

VINE IN BEARING.—A portion representing the bearing branches from the sides of a last year's shoot. The dotted line at *c* indicates where the shoots may be stopped by pinching, being at not less than *four buds beyond* the fruit. Six or eight buds distant would be better if it would not crowd the foliage too much.

EXPERIMENTS ON APPLICATION OF MANURES.

Many will recollect that I issued a circular last spring, inviting farmers to try an experiment intended to throw some light upon the proper depth at which to apply manures. It was stated in the following terms:

"Select a level piece of land of any convenient size and form, from an eighth of an acre, to a whole acre or more, the soil and subsoil and condition of which is as nearly uniform throughout as possible. Divide it into four equal plots, numbering them 1, 2, 3, and 4. Upon No. 1 spread manure evenly (broadcast) of such as you have, and enough in your opinion to secure a fair or good crop, and plow *the whole piece* to an equal depth of eight inches. Next, upon No. 2 apply in the same manner exactly the same quantity and quality of manure as was put upon number 1, and cross-plow the whole piece to half the depth of the first plowing. Next,

apply manure to No. 3 exactly as upon No. 1 or 2, and harrow or cultivate the whole piece. Lastly, apply manure to No. 4 as upon the others, and leave it upon the surface.

If these directions be accurately fulfiled, you will observe that the whole piece receives exactly the same degree of cultivation, and the same amount and quality of manure: the only difference being in the depth at which the manure was applied: and any variation in the product may safely be ascribed to *the mode of application*, which is the only point intended to be illustrated by the experiment. Upon the first we shall see the effect of covering manure 8 inches deep; on No. 2 the effect when covered half as deeply; upon No. 3 the effect of a slight covering, and upon No. 4 the effect of strictly surface manuring. Let the after cultivation be the same upon all the plots, and the harvesting be done at the same time."

It was my intention, had a considerable number of trials been reported, to present the results in a table, but as only a very few have yet come to hand, I give the reports as sent to me.

It is earnestly hoped that more attention will be paid to conducting experiments, carefully and accurately. The value of such is very great. By these only can we substitute a reasonable certainty of being right, in place of guess-work in our practice. They should be numerous—on all soils—in all seasons—with care to eliminate all sources of fallacy—and accurately reported.

Report of an experiment in the application of manure upon 2-5 *acre of land, tried in* 1860, *by* Samuel F. Perley, *of Naples, Cumberland County:*

The soil was a gravelly loam, underlaid twelve to sixteen inches below by a "hard pan."

Eight cords per acre of strong yard manure were applied.

One-half of each section was manured in the hill with fowl's dung composted with muck, one bushel of the former to eight of the latter—less than a pint to each hill.

The crop grown was corn.

Product on first fourth—barn manure plowed under eight inches deep, was 614 pounds of corn and stover, 269 pounds of corn and cob.

Product on second fourth—manure plowed under four inches deep, was 561 pounds of corn and stover, 230 pounds of corn and cob.

Product on third fourth—manure cultivated in, was 745 pounds of corn and stover, 253 pounds of corn and cob.

Product on other fourth—manured on the surface, was 651 pounds of corn and stover, 272 pounds of corn and cob.

Previous to 1859, the land had been cropped with hay, and had become exhausted. It was turned over in June, 1859, one hundred and fifty pounds per acre of guano applied, and a light crop of oats taken off.

The third and fourth sections appeared best during the summer, and the corn on these was better ripened than on the first and second. The season has been dry, much less than the usual depth of rain having fallen during the corn season, and the ground became dry far below the surface, yet this corn did not suffer from drouth; and I find on referring to the weather register that rain in small quantities fell frequently, nine days being the longest time without rain from May 20th to October 20th, and the surface has not been so dry as the subsoil. The season, on the whole, has not been unfavorable to surface manuring, though at first thought it would appear so.

Report of an experiment in the application of manure upon one acre of land, tried in 1860, *by* William Grinnell, *of Exeter, Penobscot County.*

Character of the soil and subsoil—a gravelly loam and a coarse subsoil.

Amount and character of manure applied—10 cords of green manure from the barn cellar spread on, five cords old manure scraped up in the yard the fall before, put in the hill.

Crop grown—corn.

Product on the first fourth—manure plowed under eight inches deep: Thirty-one bushels of ears.

Product on second fourth—manure plowed under four inches deep: Thirty-two bushels of ears.

Product on third fourth, manure cultivated or harrowed in: Thirty-two bushels of ears.

Product on other fourth—manured on the surface: Thirty-three bushels of ears.

The land was quite poor—was planted with potatoes the year before. The season was very dry, though we had showers that prevented the surface from parching up.

Report of an experiment in the application of manure upon ¼ acre of land, tried in 1860, *by* Augustus Sprague, *of Greene, Androscoggin County.*

The soil, a clayey loam, rather moist, and retentive of manure. Subsoil, clay.

Twelve cords of green stable manure were applied to the acre.

The crop grown was potatoes.

Product on first fourth—manure plowed under eight inches deep, at the rate of two hundred and two bushels to the acre.

Product on second fourth—manure plowed under four inches deep, at the rate of two hundred and eighteen bushels to the acre.

Product on third fourth—manure cultivated or harrowed in, at the rate of two hundred and thirteen bushels to the acre.

Product on other fourth—manured on the surface, at the rate of two hundred bushels to the acre. All sixty pounds to the bushel.

The land was in grass in 1859: produced about one ton per acre, broken up and planted about the middle of May. Season has been *remarkably* dry. Thought potatoes on number four looked rather the most thrifty in the fore part of the season, but since then, no perceptible difference.

Report of an experiment in the application of manure upon one acre of land, tried in 1860, *by* Samuel Haskell, *residing in the town of Cape Elizabeth, County of Cumberland.*

Character of the soil, light, sandy—subsoil, coarse sand, seventy-five per cent. sand, or more.

Amount and character of manure applied—one and a half cords to every quarter acre, of crude manure, hauled from yard and spread on the ground.

Crop grown—potatoes. Whole crop assorted good size, one hundred and five and half bushels: small ones picked out, sixteen and quarter bushels, in all one hundred and twenty-one bushels.

Product on first quarter acre, plowed manure under eight inches deep, twenty-two and a half bushels large and four and a half bushels small—twenty-seven bushels.

Product on second fourth—manure plowed under four inches deep, twenty-two and three-quarters bushels large and three and a half bushels small—twenty-six and one-quarter bushels.

Product on third fourth—manure cultivated in, twenty-nine and a half bushels large, and four and a half small—thirty-four bushels.

Product on other fourth—manure spread on top, thirty and three-quarters bushels large, and three and three-quarters small.

Besides the above I planted one-quarter acre without spreading manure, and put in the hill one medium shovel full of muscle mud, producing twenty-three and a half bushels large, and three bushels small—twenty-six and a half bushels.

The land last year was planted to corn; was then planted on the furrows after being harrowed and cultivated with a good dressing in hill. The ground was plowed last fall and again cultivated with an ox cultivator this spring, and then the dung was spread on to each fourth as we planted. On the fourth acre where the dung was spread on the surface and left, and the fourth cultivated, the potatoes came up best; on where manure was plowed in, did not come up well or so soon; on the fourth acre where no dung was spread, and where the muscles were put in the hill, they came up about the same as where the manure was plowed in. I attribute this failure of not coming up, in a measure, to the ground being just plowed and more cold, also to the muscles being of a cold nature. The potatoes were very smooth on the muscles, and where the dressing was plowed in, some hills were pronged: where dressing was on top or near, they were not pronged and smooth. Most of the potatoes planted, were of the Jackson whites, some mixture of State of Maine. They were cut, two pieces put in a hill, calculated to be two or three eyes in a piece. Land furrowed out three feet, and chain drawn the other way about two feet apart. The land I measured by a tape line used for measuring, the same number of hills on each fourth acre. Each hill had two parts plaster and one of guano mixed, and one large spoonful put in at time of planting, except that fourth where the muscles were applied. Where the manure was spread on the top, and where cultivated in, they started first, kept ahead and ripened first.

I am of opinion if the season had been wet, that the difference would have been greater where the manure lies near or on top of the ground. The whole piece was perfectly level, and has considerable witch grass, which injures the potato crop materially.

I have not complied in weighing the crop, but was particular to measure them exact in the same basket, at digging time. Not a half bushel of rotten ones on the whole field—excellent quality. I found upon looking more particularly to your circular, that I did not comply with its requirements. Nos. one and two had extra plowing, while Nos. three and four had none. I plowed

the whole ground, and harrowed and cultivated the same alike, and Nos. one and two had the benefit of extra plowing.

Suggestions.

The present opportunity is embraced, to offer several suggestions which it is hoped may not prove ill-timed; and first, in regard to Farmers' Clubs. It is very desirable that these be formed in every neighborhood. Repeatedly have their advantages been alluded to in previous reports, as efficient means for mutual instruction and improvement. At present, I will only add that in every instance which has come within my observation, where these have been sustained, the benefits have been very considerable, and improvement very apparent. The knowledge gained by each becomes the property of all. A contribution so small as scarcely to be felt by each, suffices to secure a valuable library. Besides the weekly sessions during the winter, it would be well to have an exhibition in autumn, early enough to allow selections to be made for presentation at the county fair, and from these, the best might be presented at the State exhibition. Such a system, if adopted, would add exceedingly to the interest of these occasions. How often is the remark made—"I could have brought as good or better myself," and often with truth, but he may sometimes be mistaken, for it is only by comparison that accurate judgment can be formed, and relative merit decided. The adoption of this plan would not only add to the interest of the County and State exhibitions, and increase the attendance, but would greatly increase their means of usefulness. Many of the county societies are too feeble, pecuniarily, to do much which needs to be done. For instance, it would be a great step to offer liberal premiums for the best general improvements upon any farm during a term of years, and to have judicious committees visit all the farms entered, annually, (and others, also, in their neighborhood, so far as practicable) as has been done by the Cumberland society. The testimony regarding the beneficial effects of such premiums, is very strong. Premiums for specific objects, requiring a term of years, might also be offered to advantage, as for planting of orchards, draining of lands, &c., &c. One reason why many societies are feeble, probably, is that the number incorporated, in some counties, is larger than can, in the present condition of things,

be well sustained. One strong and efficient society can do more than three or four feeble ones. It is not impossible that in some cases, the efforts of several might be concentrated with better results than would follow the establishment of new ones.

It may be well to inquire how far the complaints sometimes made are well founded, that features of an objectionable character, and having no legitimate connexion with agriculture, are introduced at our annual exhibitions, merely for the purpose of drawing a crowd; such as trials of speed with horses, female equestrianism, trials of fire engines, &c. With regard to the latter, it may be remarked that our statute, respecting agricultural societies, mentions *manufactures* as equally under their patronage with agriculture. Now if balloon ascensions, trials of fire engines, and the like, are connected with the progress of manufactures, it is something equally to the point, and they may properly come in. For one, I see little connexion with either, and yet something may perhaps be allowed to the consideration that Americans, as a people, have fewer holidays and festive occasions than almost any other: and farmers, certainly, no more than other classes among us. Occasions of public amusement and recreation of an unobjectionable character, might doubtless be introduced to advantage to a greater extent than now exists.

Equestrian exercises certainly furnish an excellent and healthful exercise for both sexes, and it is a very desirable accomplishment for any one to be able to ride well. It is not easy, however, to see how *public displays* of female equestrianship tend to promote agriculture or the mechanic arts, but whether this be insisted upon or not, it should at least be shown that they do not conflict with a healthful state of public morals, nor with good taste, before they be admitted to form a part of our exhibitions. A good cause needs no support, and should accept of none from improper means, or from any of doubtful propriety. The jesuitical maxim, that the end justifies the means, has no more truth, when applied to agriculture, than to any other worthy object.

Trials of speed with horses, appear to me to occupy a different position. They are legitimately connected with the purposes for which agricultural exhibitions are held. That they are sometimes accompanied with much which is objectionable, is not denied; but the connection is not a necessary one. They can be, and should be, elevated entirely out of the sphere of jockeyism. Speed is an element of value in a horse as really as power, endurance, or action. It is everywhere so recognized, and will command its

market price in dollars as readily as any other desirable quality. The man who rears horses, may as properly regard it in breeding, as the man who rears sheep may regard fineness of fleece, and when either presents his animals, he is entitled to a full and fair examination. Speed is of little value, however, unless accompanied with other desirable qualities; and the trials should *have reference to all qualities*, speed included, and each should be fairly estimated — undue prominence being given to none. This being understood to be the rule, and good committees appointed, it is easy so to conduct the trials that they may be a source of unmixed gratification, and be enjoyed by all who love to see God's creatures in their best estate.

Trials of horses and of working oxen should be conducted on the same principles. A horse may excel in speed, and yet be an an unsound, vicious, and almost worthless animal. A yoke of oxen may move a heavier load than any other, and yet be so undisciplined and dangerous that no farmer would be willing to employ them to do his labor. Trials at agricultural shows *should embrace the qualities which constitute value.* These trials, together with plowing matches, are among the most attractive portions of our exhibitions, and we cannot afford either to lose them, or to have them perverted.

Lung Murrain—Mis-called Pleuro-Pneumonia.

When my last report was submitted, a deadly disease was lurking in the herds of Massachusetts, although its presence was not generally known until some months later. On the 28th of last May, Gov. Morrill appointed a Commission to visit the infected district, and investigate the disease. The report of this Commission was published in pamphlet form, and was also inserted in our agricultural volume of the past year. It is highly gratifying to be able now to state, that owing to the prompt and vigorous measures adopted, the disease is believed to be exterminated, or virtually so. Further research, and additional testimony regarding the nature of this alarming murrain, corroborate the views expressed in that report. Very recently, Prof. Simonds, of the Royal College of Veterinary Surgeons, England, as reported in the November No. of the London Farmers' Magazine, expressed himself as follows:

"As to 'pleuro-pneumonia,' he might say in the outset, that this was a misnomer, and the erroneous name had done not a little to mystify the subject. The name of a disease should always correspond with its nature. Pleuro-pneumonia signifies inflammation of the pleura and substance of the lungs; but this disease was not of an inflammatory character. Is it contagious? Cases have been mentioned which *appear* to prove that it is not. We had but too strong evidence that it *was* contagious.

This morbific matter entered the system, and when seated there, poisonous exhalations were given off. This was the case in small pox, after the disease had reached a certain stage pustules were formed, and each pustule contained the same morbific matter as was originally inhaled. It was not the case that all animals exposed were infected any more than it was with man. There must be a susceptibility as well as a cause. Some constitutions would resist more than others, just as men were differently affected by strong drinks; what would intoxicate one man would produce no effect upon another. This opened the way to speak of secondary causes, and how farmers might help nature to resist the disease. Animals were rendered more susceptible by over-crowding. Hence in the London dairies the disease was more rife than anywhere else. Damp and wet yards were also to be avoided, and keeping cattle in places where much dung was fermenting, especially if animal matter was present. There were some pastures which, in dry weather were unexceptionable; the same pastures in autumn, when exposed to fogs and damp, would engender it. To use plain language, we must have our wits about us. As for the malady itself, it was not an inflammatory, but a local and specific one. The morbific matter enters the blood by respiration, and then concentrates itself in the lungs. This affection was in many respects very peculiar.

It is an eminently fatal disease.

Bring any of the boasted remedies to a genuine case—one fully established to be such by the testimony of competent persons, and they invariably failed. The lungs were aurifying organs, and both in cattle and in man, *nature is unable to remove the deposits caused by disease, and to substitute sound tissue in the place of that destroyed. It was always a fatal disease, and it always would be;* the more we know of it, the more positive were we of this. *In no one case has an animal ever been cured.* The disease is sometimes *ar-*

rested, but never cured. It often happens that cattle are sold appearing well, and when slaughtered the lung is found diseased. Sometimes in the centre of an apparently healthy lung, a diseased portion is found which is dead and insulated by nature from the living part, being surrounded by a layer of lymph. In no case was the mischief done by the disease upon the lung, ever repaired. When does its contagion cease? is a question upon which there has been much discussion, and which is still undecided. As soon as the animal sickened, the disease was contagious. If it was arrested, it was not easy to say how soon the animal might safely mix with others. The legislature might with much benefit to the country, take this matter up. On the continent, the measures taken by governments had done much to stay the ravages of the disease. In some countries, if a herd was affected, it was compulsory to separate it immediately; the proprietor was compensated by government, whose officers took possession of the herd. Those badly diseased, were slaughtered, and those that were not affected, or had recovered, were branded on the horn, so as to be always known. By the adoption of such measures as these, much had been done to lessen the severity of the scourge.

The principles of treatment: These could only be properly put into operation by a veterinary surgeon. *As a farmer himself, and addressing farmers, he would recommend when the disease was decided, to spend nothing in physic. Get rid of the beasts* as soon as possible. The first loss is the best."

This Lung Murrian is both epidemic and contagious, like small Pox. At times it will rage with greater violence than at others, and sometimes nearly subside.

Its continued existence abroad being known, both in England, Holland and other countries of Europe, its *contagious* and *fatal* character being fully established, it behoovs us to be constantly on our guard against future introduction of so dreadful a disease. It would doubtless be a wise measure for Congress to establish some quarantine regulations, and enforce a rigid inspection of such animals as may be imported in future; and may I not suggest that it would be wise for the legislature of this State to enact a general law applicable to any cases where a deadly contagious disease should appear among cattle, thus threatening the most important interest of the State. The loss of our herds would be nothing short of a death blow to the agriculture of the State.

S. L. GOODALE.
Secretary of the Board of Agriculture.

AUGUSTA, JAN. 16, 1861.

Societies.	Amount received from the State.	Amount received from Members and Donations.	Am't. received from all other sources.	Whole amount of Receipts. for the year	Amount of Premiums offered.	Amount of Premiums and Gratuities awarded.	Current Expenses of the Society for the year.	Whole amount of Disbursements.	Value of Real Estate	Value of other Property.	Liabilities.
Androscoggin County,	300 00	557 00	392 00	1249 00	541 00	366 00	386 00	742 00	9000 00	–	6250 00
Cumberland County,	300 00	101 00	321 00	722 00	571 00	312 00	367 00	680 00	–	909 00	–
East Somerset,	150 00	110 00	100 00	360 00	210 00	193 00	60 00	253 00	1200 00	–	900 00
East Washington,	73 00	–	379 00	452 00	553 00	490 00	150 00	640 00	–	200 00	–
Franklin County,	200 00	20 00	271 00	491 00	475 00	209 00	150 00	359 00	1100 00	–	600 00
Hancock County,	300 00	58 00	459 00	817 00	664 00	802 00	111 00	813 00	2500 00	–	1400 00
Kennebec County,	150 00	100 00	210 00	460 00	358 00	224 00	255 00	479 00	–	300 00	150 00
Kennebec Union,	–	–	–	–	600 00	282 25	105 00	–	–	–	–
Lincoln County,	300 00	90 00	240 00	630 00	634 00	312 00	439 00	760 00	–	40 00	125 00
North Aroostook,	200 00	30 00	175 00	405 00	204 00	162 00	60 00	222 00	–	30 00	–
North Franklin,	200 00	5 00	299 00	504 00	438 00	326 00	243 00	569 00	–	–	–
North Penobscot,	129 00	10 00	71 00	210 00	274 00	111 00	60 00	249 00	–	–	–
North Somerset,	150 00	5 00	80 00	235 00	247 00	193 00	50 00	243 00	–	–	–
North Kennebec,	150 00	–	241 00	391 00	–	–	125 00	–	2500 00	–	1000 00
Oxford County,	200 00	5 00	452 00	657 00	371 00	333 00	374 00	694 00	1000 00	220 00	785 00
Pen. and Ar. Union,	118 00	106 00	30 00	274 00	155 00	153 00	76 00	229 00	–	–	–
Piscataquis Central,	96 00	101 00	5 00	202 00	275 00	154 00	20 00	–	–	–	–
Sagadahoc County,	300 00	410 00	402 00	1112 00	575 00	482 00	256 00	1071 00	3800 00	50 00	2493 00
Somerset Central,	150 00	–	469 00	619 00	500 00	381 00	156 00	591 00	2500 00	50 00	1000 00
Waldo County,	253 00	1161 00	430 00	1845 00	481 00	396 00	1700 00	2177 00	1500 00	75 00	475 00
Washington County,	200 00	17 00	262 00	479 00	664 00	392 00	320 00	712 00	–	–	–
West Oxford,	200 00	10 00	384 00	594 00	311 00	280 00	250 00	580 00	1800 00	–	700 00
West Penobscot,	150 00	29 00	168 00	347 00	444 00	223 00	40 00	263 00	–	–	–
West Somerset,	150 00	690 00	74 00	914 00	154 00	163 00	52 00	1156 00	1000 00	50 00	475 00
West Washington,	200 00	81 00	246 00	527 00	232 00	184 00	145 00	329 00	–	–	–
York County,	300 00	115 00	659 00	1104 00	600 00	500 00	225 00	1082 00	2000 00	–	1600 00

COMPILED FROM RETURNS OF AGRICULTURAL SOCIETIES.

Societies.	Amount awarded for Bills.	Amount awarded for Working Oxen.	Amount awarded for Milch Cows.	Amount awarded for Heifers and Calves.	Amount awarded for Fat Cattle.	Amount awarded for Horses.	Amount awarded for Swine.	Amount awarded for Sheep.	Amount awarded for all other Live Stock.	Total amount offered for Live Stock.	Total am't awarded for Live Stock.
Androscoggin County,	18 00	17 00	17 00	25 00	3 00	39 00	7 00	5 00	20 00	273 00	152 00
Cumberland County,	20 00	39 00	16 00	6 00	11 00	51 00	12 00	8 00	22 00	326 00	190 00
East Somerset,	11 00	10 00	5 00	13 00	–	47 00	3 00	5 00	19 00	119 00	113 00
East Washington	27 00	38 00	20 00	16 00	–	140 00	23 00	24 00	–	168 00	291 00
Franklin County,	17 00	5 00	8 00	12 00	4 00	47 00	5 00	12 00	24 00	294 00	137 00
Hancock County,	6 00	19 00	15 00	12 00	2 00	11 00	4 00	9 00	3 00	190 00	78 00
Kennebec County,	5 00	54 00	5 00	4 00	6 00	55 00	6 00	8 00	–	231 00	153 00
Kennebec Union,	21 00	28 00	13 00	13 00	5 00	50 00	3 00	25 00	13 00	300 00	171 00
Lincoln County,	11 00	18 00	18 00	8 00	8 00	44 00	7 00	3 00	2 00	226 00	134 00
North Aroostook,	7 00	15 00	20 00	5 00	–	28 00	–	4 00	16 00	122 00	95 00
North Franklin,	9 00	7 00	5 00	9 00	7 00	28 00	3 00	13 00	66 00	193 00	147 00
North Kennebec,	15 00	42 00	5 00	6 00	4 00	94 00	9 00	34 00	19 00	296 00	228 00
North Penobscot,	3 00	7 00	3 00	11 00	–	20 00	2 00	6 00	–	137 00	65 00
North Somerset,	12 00	32 00	4 00	8 00	–	19 00	3 00	16 00	42 00	164 00	137 00
Oxford County,	30 00	31 00	4 00	8 00	5 00	60 00	6 00	10 00	28 00	197 00	182 00
Pen. and Ar. Union,	9 00	25 00	9 00	6 00	–	23 00	4 00	5 00	6 00	89 00	81 00
Piscataquis Central,	28 00	16 00	3 00	5 00	–	40 00	–	13 00	10 00	140 00	105 00
Sagadahoc County,	32 00	11 00	22 00	41 00	14 00	24 00	14 00	8 00	61 00	278 00	228 00
Somerset Central,	12 00	50 00	6 00	12 00	5 00	56 00	12 00	29 00	45 00	250 00	227 00
Waldo County,	9 00	24 00	7 00	11 00	4 00	44 00	12 00	12 00	30 00	213 00	153 00
Washington County,	16 00	60 00	9 00	11 00	2 00	16 00	3 00	9 00	–	235 00	125 00
West Oxford,	5 00	5 00	3 00	3 00	7 00	29 00	11 00	13 00	24 00	143 00	100 00
West Penobscot,	22 00	11 00	6 00	6 00	–	33 00	–	13 00	26 00	250 00	116 00
West Somerset,	13 00	17 00	11 00	8 00	–	15 00	3 00	19 00	56 00	150 00	140 00
West Washington,	8 00	9 00	6 00	6 00	–	78 00	–	6 00	12 00	72 00	60 00
York County,	24 00	18 00	8 00	7 00	12 00	47 00	25 00	10 00	73 00	219 00	224 00

INDEX.

MEISEL BROS LITH BOSTON

COTHERSTONE

THOROUGHBRED.

ABSTRACT OF RETURNS

FROM THE

AGRICULTURAL SOCIETIES

OF

MAINE,

1860.

EDITED BY

STEPHEN L. GOODALE,

SECRETARY OF BOARD OF AGRICULTURE.

AUGUSTA:

STEVENS & SAYWARD, PRINTERS TO THE STATE.

1861.

CONTENTS.

MAINE STATE SOCIETY.

Dr. Holmes, Secretary of the Society, gives the following general statement in regard to the Show and Fair for this year, which was held in Portland:

"Every convenience and fixture was well fitted up for the reception of the horses, cattle, &c., &c., usually exhibited.

The Show opened well on Tuesday morning, according to programme, and passed along pleasantly and successfully, excepting a temporary disturbance occasioned by a copious shower on Tuesday afternoon, which, as a natural consequence, for the time being, was a *tangible damper* on out-door proceedings. The remainder of the week was bright and clear, but rather too breezy and cool for the season.

The Horse department, as usual, was well filled with very many excellent horses, and some indifferent ones. Their display, and their exercises in the different departments of their class, demonstrated that there was at least no diminution of strength and discipline in the horses of Maine, and that their reputation for speed and endurance is still well sustained.

The cattle department was well filled. Every stall and stable was occupied with choice stock. Marked variations are always manifest in the numerical amounts of the various breeds, according to the locality of the Show. In Kennebec the Durhams were in the ascendent numerically. Here the Durhams were less numerous, and the Devons took the front rank. A good display of Durhams was, however, made by W. Percival of Vassalboro', O. Whittier of North Vienna, and others. Our old friend Isaac Wentworth brought on the prime Devons of the East Poland Shaker family. J. F. Anderson of South Windham, also brought on his beautiful stock of Devons which he is very successfully breeding back to the original milking qualities, once known among the Devons of olden time.

Many other Devons, from different sections of the State, were also on the grounds. The Ayrshires were not very numerous, but some excellent specimens were exhibited by S. L. Goodale of Saco, N. Foster of Gardiner, D. Webster of Bangor, John Rogers of Kittery, and others. We missed the Underwood stock of Herefords. But one or two Herefords were on the ground; a splendid bull of this breed was exhibited by J. P. Perley of Bridgton. Of Jerseys there was an increase. In spite of the lack of portly size and symmetry of form, and notwithstanding the jokes and jeers of those who look at cattle only through a *butcher's eye*, they have steadily increased from an exhibition five years ago, of only *three* individuals, (being all that were then owned in Maine,) up to thirty entered at the last Show. Their dairy qualities are becoming appreciated, and by their good deeds they are slowly working their way as they are better known. Good specimens of full-bloods were exhibited by Messrs. Hammond of Westbrook, Bailey of Portland, Lunt of Portland, Dike of Bath, Holmes of Winthrop, and others. The exhibition of Galloways was small. The representatives of this race were confined to those exhibited by Holmes of Winthrop. The owners of this stock in other sections of the State were remiss in not bringing them forward.

The Hog department, though not very numerous, nevertheless showed a marked improvement. There was not a mean specimen on the ground. The Chesters of Messrs. Weston of Bloomfield, Chamberlain of Foxcroft, Dillingham of Sidney, were very fine.

There was a great falling off in the Sheep-fold. We missed the fine flocks of Somerset County. The exhibition consisted of pairs of the several breeds. South Down by O. Whittier of North Vienna; Oxford Downs by W. A. P. Dillingham of Sidney; Merinos and Cotswold by L. Wood of Winthrop.

The Poultry department was much better filled than last year. An increase in the amount, and a better classification of premiums offered for poultry, have evidently brought on increased symptoms of a "hen fever," as manifested by a greater variety and number of hens, ducks, turkeys, geese and pigeons exhibited, to say nothing of lop and *non*-lop eared rabbits that appeared upon the ground. The principal exhibitors were Purrinton and Bailey of Westbrook, P. H. Holmes, Winthrop, E. Barrows, Augusta, C. Hunnewell, South

Windham, T. Kilby, Portland, H. M. Davis, Portland, J. F. Anderson, South Windham, and W. Jordan of Yarmouth. We are glad to see that this humble, but useful branch of live stock is coming up again. We all like the comforts of a good feather bed at night, and a boiled egg for breakfast, and for the abundance of these we must look to the poultry yard.

A new feature of the live stock exhibition was a pen full of goats, from a skipping, roguish kid, to a grave old *he* one, with a fashionable goatee depending *a la mode* from his chin. As there were no premiums offered for these "*Hircine*" productions, we see no report in regard to them made by any of the committees.

The Drawing Match was handsomely contested. We always take more interest in this than we do in the trotting contests. The ox is a great institution in Maine, and his capacity for receiving discipline and instruction was strikingly demonstrated at this Show, not only by the several teams brought forward, but more particularly in the working of the steers exhibited by young Curtis of Woodstock, and Tuell of Paris.

As a whole, the exhibition in the halls was very satisfactory, and made a brilliant, as well as instructive show.

We regret to say that there was a great falling off in the Dairy department, not only in the quantity but quality of the products. This must be attributed to the unparalleled drouth which has borne so heavily all summer upon Maine. It is impossible to make good butter and cheese, or much of it, when the grass of the pastures is dried and roasted to a crisp. Another year, we hope, will bring back the Maine dairies to their former good condition.

The Mechanical and Horticultural departments in the new City Hall were crowded, and the gallery of fine arts was uncommonly fine."

Extract from Report of the Trustees of the Maine State Agricultural Society for 1861:

"At the last annual meeting the subject of holding the usual annual Show and Fair for 1860 was discussed, and was left informally to the discretionary power of the Trustees, both as to the time and place of holding the same. In accordance with that discretionary power thus given, the Trustees, after negotiating with citizens of Bangor, Augusta and Portland, closed with the authori-

ties of the latter city, upon terms apparently securing the Society against loss, and promising financial success.

But, notwithstanding such favorable prospects, the Trustees, thinking it prudent, required and obtained a bond, signed by several responsible gentlemen of Portland, indemnifying the Society against loss.

Immediately upon the execution of said bond, public notice was given of the time and place of holding the Show and Fair, and the prize list made up and published. The other usual necessary preparations for the exhibition were actively commenced.

The Society, through the liberality of the city government, were accommodated with the spacious rooms and halls of the new city building, where were exhibited an unusual variety of agricultural and horticultural products, while the show of domestic manufactures, dairy products, agricultural implements, new and improved machinery, and mechanical inventions, together with such miscellaneous articles as are generally collected at such exhibitions, filled several large rooms and halls.

One of the most attractive features of the exhibition was the picture gallery, contributed principally by the citizens of Portland, which, for variety and extent of value, has never been equalled in this State, and the artistic skill and good taste manifested in the arrangement of the several paintings, added materially to its attractions.

The horticultural department, managed by the Portland Horticultural Society, was also an exceedingly pleasant and attractive feature of the Show.

The first day of the Show was stormy and quite unfavorable for the operations upon the grounds, but the exercises assigned for that day were duly performed—the stock all properly arranged for the examination of the committees and the public.

The display of neat stock was extensive and of the very first quality, indicating an increased interest and a growing determination on the part of the farmers of the State, not only to obtain improved breeds of cattle and other stock, but also to improve themselves in the practical science of breeding the same.

The attendance upon the grounds, probably owing to there having been, during the season, so many exciting public meetings, and also

in consequence of the cold and blustering weather that succeeded the storm of the first day, was not so large as we commonly have on such occasions. On this account but comparatively few of the visitors repeated their visits, as has heretofore been usual, on successive days.

The consequence of this was a falling off of the receipts far below the anticipations of the Trustees. Here the Trustees feel it to be their duty to give to the Society the conviction, forced upon them by the experiences of this and the last two years, that in consequence of the great expense required in fitting up temporary fixtures to accommodate the Show on the present itinerary or rotative system, however productive these Shows may be of lasting good to the agricultural community, they do not enable the Society to become self-sustaining in a financial point of view. We therefore suggest for the consideration of the Society whether, until some permanent arrangements can be made to locate the Society in the vicinity of some of our large cities—obtaining suitable grounds and erecting thereon permanent buildings and other fixtures for the accommodation of the institution and its various operations, thereby avoiding the enormous annual expenditure and loss for erecting such fixtures each successive Show and Fair, the usual annual Shows of the Society be suspended, and the Trustees in the meantime be authorized to investigate the subject more thoroughly and take such measures to consummate the location in one, two or three permanent places, and devise such ways and means as shall ensure its success.

Inasmuch as there has been an association lately organized in this State for the encouragement of the breeding of horses, and especially fleet horses, under the direction of gentlemen fully competent to manage the same, the Trustees would also suggest whether it would not be preferable to dispense with that feature in our Shows, confining our premiums in the horse department to a mere exhibition of their form, symmetry and action as roadsters, and their capacity and endurance as draft horses."

From Report of Committee on Short Horns.

The committee on this department of the exhibition have endeavored to discharge their duty with the single view of promoting the interest of breeding choice and high blooded animals in Maine. If we may not be able to compete successfully with the great West in stock raising, on account of the severity and long continance of our winters, and for the want of the natural and abundant pasturage of more hospitable latitudes, yet it is obviously our interest to care for the *quality* of the stock we furnish.

In order to secure the best physical development of the animals we raise, and to have choice animals the rule and not the exception, we must be content only with those strains of blood which are of unquestioned purity.

There is a large amount of capital invested in superior stock, and larger investments will be made in the future, which press on our consideration the claims of the several favorite animals to their superior position and quality. How shall it be determined whether one or another of equally finely formed and superior looking animals should be held in higher regard? The only way that can be practically and intelligently adopted to decide as to the merits of a breeding animal, is by referring to the Herd Book, and there finding or not, the line of noble and pure ancestry of the animals to be encouraged as the propagators of their species, or to be discarded however fat and sleek they may be. Not the rich pasture, not the generous grain box is the source of good blood and reliable qualities, but the evidence of such character must be found in the Herd Book. It is the *blood* we need.

A gratifying contrast we have in Maine; the enthusiastic Devonman, with his high colored, compact, hardy and uniformly handsome herd, and by his side stands the Durham competitor, who raises great oxen for all emergencies; who prides himself in the stately bull, in the cow with small and tapering head and neck, with large body and wide spread hips, which mark her both for stock and the dairy. While one seeks beauty and elegance, the other wishes size and strength. The one is content with a fair allowance of good milk, while the other wants a bucket full from a single cow the year through. The one seeks an animal that will always look fat and strong in ordinary keeping, while the other wishes for an animal

that will grow up rapidly and eat all before him; but that when brought to the shambles will make a ton of beef.

It is well that both classes of cattle have their admirers. It will be for the advantage of the State.

In this cattle exhibition, Mr. Warren Percival is the gentleman who bears away every premium given to the full blood Durham stock; for he alone filed in his pedigrees for the consideration of the committee.

The pedigree animals, and they alone can, or ought to carry away the tokens of the generosity of the State in the class of breeding stock.

The animals in the grade department were very fine, some of them, and it was pleasant to the committee to be able to give them some slight evidence of appreciation of their disposition to bring their best animals to the State Fair.

W. A. P. DILLINGHAM, *Chairman.*

The awards in this class were as follows:

To Warren Percival of Vassalboro', for his bull "Duke of Manlius," the first premium. [See 4th vol. Am. Herd Book.] Duke of Manlius, got by Echo of Oxford, out of Olivia, got by Lord Ducie, imported by Dr. Wendall of Albany.

To the same, for best Short horn cow, "May Day," 5 years old, got by Bay State (237), out of May Flower by North America (116), out of Prize by Dictator (3591), out of Princess by Washington (1566), out of Pansy by Blaize (76), out of Primrose by Charles (127.)

To the same, for second best, for Prize, 4 years old, calved Feb. 20, 1856, got by Logan (1784), out of Prize by Dictator (3591) &c.

To the same, for third best, for Lady Grey, calved March, 1857, got by Bay State (237), out of May Flower by North America, (116) out of Prize by Dictator, &c., &c.

To the same, for best yearling heifer, for May Day, 3d, out of May day, being her second calf by Boz, out of Stately by Rough and Ready (930), out of Stella by Logan (95), out of Stately by North Star (4592), out of Princess by Splendid (5297), &c., &c.

To the same, for best heifer calf, May Day, 4th, out of May Day by Earl of Warwick, (recorded in 3d vol. Am. Herd Book.)

Report on Ayrshires and Jerseys.

Your committee are pleased to report a good exhibition of the much abused and underated Jersey or Aldernay stock. We would particularly mention Mr. P. H. Holmes' herd, of Winthrop, who has been a successful breeder of Jerseys for some years, and who with his father, Dr. E. Holmes, have done more toward introducing the breed and doing away the strong prejudice against them, than any other men in the State.

Mr. G. H. Bailey of Westbrook, though a beginner, exhibited some very fine stock, a part of which he, at great expense, obtained from one of the most noted breeders of Jerseys in Massachusetts—a fine heifer, three years old, which Mr. Bailey exhibited, particularly attracted the attention of the committee but not having calved, was not entitled to a premium.

The Jerseys are becoming more popular; for butter making they they have no superiors; the quantity of milk they give is small, but the richness (as proved by the lactometer) far exceeds that of any other breed. We cannot give our opinion of Jerseys better than is expressed in Mr. C. A. Church's report on stock, to the Massachusetts Agricultural Society. After describing the Aldernay, Mr. Church says, "if we except a bright eye, delicate muzzle, and a sharp little horn which gives them a certain game look, these rawboned little creatures can hardly be deemed beautiful.

Probably four out of five of our farmers, unacquainted with their merits, would pass them by with derision; regarding them as ridiculous monsters in ugliness, if not in size. But let any one of these farmers behold a few pans of Aldernay milk upon which the golden cream had risen, or spread upon bread the delicious butter made from that same cream, and these little cattle will be clothed with a beauty that the eye alone was unable to discover.

The Aldernay cattle have always, as far back as their history extends, maintained an unrivalled reputation as producers of delicious cream, from which is made the finest butter. Their yield in milk is never very large, but the milk is always exceedingly rich, producing rarely less than twenty-five, and often thirty-five per cent. of rich cream, always of a deep golden hue."

Mr. Thos. Motley, Jr., of Massachusetts, who was sent abroad by the Massachusetts Agricultural Society in 1851, for the express

purpose of selecting Aldernays to be introduced among the cattle of the State, says, "the quality of the milk is most excellent and quantity fair, and they hold out longer, so far as I know, than any other breed. The butter made from the milk of Jersey cows, will always command the highest price, is of a rich gold color and fine flavor, even in winter. They are daily growing in favor with our farmers and milkmen."

Your committee would add that when dry they fatten very easily and make excellent beef; and are well adapted to the climate of Maine.

Of Ayrshires, there were not so many on exhibition as we expected to see, judging from the popularity of the breed.

S. L. Goodale of Saco, entered some of the handsomest animals of this breed that we have ever seen. The breed stands high for milking qualities, giving a much larger quantity of milk than the Jerseys, although not so rich; are of medium size, well proportioned, easily fattened and make good beef, are very hardy, and will thrive on coarse feed, are of a very quiet and peaceable disposition, and with an ordinary fence can be kept within an enclosure without trouble. Your committee would recommend them as excellent dairy cows, particularly adapted to our soil and climate.

A cross of the Ayrshire or Jersey would very much improve our stock of milk cows There are many neighborhoods and some towns where you will find only our native cows, and they so much reduced by a long course of "in-and-in" breeding and poor feed, that they are not worth their keeping. While the imported breeds are so expensive, would it not be well in every neighborhood to form a company and purchase a bull of such breed as will suit their wants? And should we not soon see our herds improving, and our dairies increasing in profit?

Of Galloways, your committee have to report but two entries, and those of grade animals. We do not think they will ever take the place of the Jerseys or Ayrshires for dairy purposes, or of the Durhams for workers. They are said to be a hardy breed, good milkers, and make good beef.

All of which is respectfully submitted,

Per order,

CHAS. C. G. THORNTON.

The awards on these classes were as follows:

For best Ayrshire bull, three years old or over, to Nathan Foster of Gardiner—bred by Gray of New Brunswick.

For second best, to D. Webster of Bangor.

For second best two years old, John Rogers, Kittery.

For best bull calf, and best heifer two years old, to the same.

For best and second best cows, to S. L. Goodale, Saco—bred by Gray, New Brunswick

For best yearling heifer and heifer calf, to the same—bred by himself.

For best Jersey bull three years old or more, to G. W. Hammond, Westbrook—the sire imported by Motley, and the dam by French.

For second best do., to J. R. Lunt, Portland—the dam imported by Bryant, and the sire by Hobart.

For second best two years old, P. H. Holmes, Winthrop—out of Butter Cup by the Chisham bull.

For best one year old, S. F. Dike, Bath.

For second do., G. H. Bailey, Westbrook—bred by Grant of Farmingdale.

Best Jersey cow was shown by G. W. Hammond of Westbrook, (took first premium before.)

For second best cow, to P. H. Holmes—out of Pansey by Butter Boy.

Also, to same for best two years old heifer.

For third best cow, to S. F. Dike, Bath.

For best heifer calf, G. H. Bailey, Westbrook.

Herefords and Devons.

Best Hereford bull, three years old or more, premium to John P. Perley, So. Bridgton.

Best Devon bull, three years old or over, to Isaiah Wentworth, Poland.

Second do., to Isaiah Cortland, Brunswick.

For best Devon bull, two years old, to Thomas Minot, Brunswick.

For best yearling Devon bull, Isaiah Jordan, Brunswick.

Second do., to Samuel H. Soule, Freeport.

For best Devon bull calf, to W. A. P. Dillingham, Sidney.

Second do., to Isaiah Jordan, Brunswick.

For best Devon cow, three years old or more, to John F. Anderson, So. Windham.

Second do., to Isaiah Wentworth, Poland.

Third do., to John F. Anderson, So. Windham.

For best and second best two years old Devon heifer, Isaiah Wentworth.

For best yearling Devon heifer, John F. Anderson.

Second do., S. H. Soule, Freeport.

For best heifer calf, I. Wentworth.

Second do., John F. Anderson.

The exhibition of Devons was more extensive than of any other breed, and embraced many fine animals. Among the returns are found pedigrees of the following, shown by John F. Anderson, So. Windham:

"Paris," calved May, 1856, sired by Caledonia, (379 Am. Herd Book.) His dam, Milkmaid, (1406) from Patterson stock.

"Presumscot," calved May, 1860. Sire, Norfolk, 3d; grandsire, Norfolk, 2d; great-grandsire, Norfolk, (266.) Dam, Jenny Lind, 2d; grand-dam, Ellen, 2d; great-grand-dam, Ellen, from stock of Geo. Patterson, Maryland.

Cow "Galaxy," bred by Geo. Patterson, purchased of him Oct., 1859. Sire, imported Herod, (214.) Dam by imported Eclipse, (191); grand-dam by imported Anchises, (140.)

Cow "Devonia," bred by Geo. Patterson. Sire, imported Herod, (214.) Dam, by imported Eclipse, (191.)

Heifer "Fanny Perley." Sire, Norfolk, 3d. Dam, Jenny Lind, 2d.

Devon bull calf "Roderic," shown by W. A. P. Dillingham of Sidney. Sire, Rob Roy; grandsire, Paul Somerby, &c. Dam, Jessie by Alexander; grand-dam, Baltimore, 3d, &c.

Milch Cows and Herds.

For best milch cow, to S. L. Goodale, Saco, for an imported Ayrshire—gave in June 46 to 48 lbs. daily on pasture alone. In August the yield was 33 to 36 lbs daily. A trial of her milk within a week of the Exhibition showed that 8 quarts (full measure of 2½

lbs. to the quart) made a pound of butter. Weight 800 lbs.—age, five years.

Second do., to F. O. Henley, Westbrook.

Third do., E. Thoits, Pownal.

Statements indefinite regarding the last two.

For best herd from one farm, not less than six, to John F. Anderson, So. Windham.

Second do., to Isaiah Wentworth, of Poland.

HORSES.

Stallions. For best stallion, six years old and upwards, for getting horses for all work, endurance and docility considered, his pedigree and some of his stock to be exhibited to committee, to Wm. Hodge, Kennebunk, for Black Hawk.

Second best, to H. McManus, Brunswick, for Morgan and Eaton.

For best four to six years old stallion, his stock not required, to John Shaw, Augusta, for Mack, Messenger and Morgan.

For best three years old, James E. Leighton, Gray.

Second best, Nelson Haskell, Portland.

For best two years old, D. T. Grant, Durham.

For best yearling, C. A. Rackliffe, Westbrook.

Mares and Foals. For second best breeding mare, with some of her progeny by her side, to G. & L. P. Warren, Westbrook, for Messenger.

Third best, to Thos. W. Larrabee, Sebago, for Morgan.

Per order,

EBEN WOODBURY.

Geldings and Mares, for general use as roadsters and carriage horses. For best mare, five years old and upwards, H. J. Little, Portland.

Second best, Irving Blake, Portland.

For mare, four years old, gratuity, W. T. Rolfe, Scarborough.

For best gelding, five years old and upwards, Samuel Ramsey, Portland.

Second best, C. A. Merrill, Cumberland.

For best gelding, four years old, John Draper, Portland.

For best colt, either filly or gelding, three years old, to T. W. Larrabee, Sebago.

Second best, to J. E. Leighton, Gray.

For second best colt, two years old, to A. Libbey.

Matched Horses. For best span of carriage horses, to P. H. Brown, Portland.

Second best, to Abner Toothaker, Rangely.

Third best, to Frank Andrews, Saco.

Saddle Horses. For best saddle horse, to H. P. Storer, Portland.

Second best, to G. & L. P. Warren, Westbrook.

Sheep.

For best flock of lambs, not less than fifteen in number, from one farm, to M. W. Mosher, Gorham.

For best Spanish Merino buck, to Lewis Wood, Winthrop.

Second do., to same.

For best Leicester buck, to B. R. Sturgis, Gorham.

For best South Down ewe, to Obadiah Whittier, of Vienna.

For best Oxford Down buck, to W. A. P. Dillingham, Sidney.

For best Oxford Down ewe, to the same.

From Report on Swine.

There were thirteen entries—forty-six in all. General appearance good.

The committee are forced to the conclusion that this department has not received the attention its importance demands. Yet, from the exhibition of the Chester County breed by Mr. Dillingham of Sidney, Mr. Weston of Bloomfield, and Mr. Chamberlain of Foxcroft, we look forward with hope, believing it a right step in the right direction. Your committee are of opinion that this breed will prove a very valuable acquisition to Maine.

Their quiet temperament, symmetrical form, good feeding qualities, and readiness to take on fat at any age, yet still growing to a very large size if kept to mature age, are such as to recommend them to the farmers of Maine.

Your committee think the swine, to a certain extent, a self-sustaining animal. In this State our great impediment to successful agriculture, is the want of fertilizers to produce that quick and vigorous growth necessary in our short seasons. The swine is pre-eminent, from his nature and habits, for converting or manufacturing substances which alone are worthless, or nearly so, into fertilizers of the first order.

In order to be self-sustaining, it is necessary to obtain the best breed, or that form which will secure the most and best growth from an equal amount of food supplied. And here we are met with difficulties at the onset, for in the same breed, and even in the same litter, there are differences in qualities of thrift, and not unfrequently difference in form.

Your committee submit the following description of a form which seldom, if ever, fails to meet the expectations of the careful and practical feeder:

1. The swine should be *short* in the head, neck and legs.
2. Long and round in the body.
3. Deep in the flank, and well spread in the stifle and hips.
4. Broad and deep at the lungs.

In breeding, if the female be deficient in one or more of these points, a male should be sought that possesses in a very prominent degree the point or points in which the female is deficient.

All these marks are generally as prominent at four weeks old as at mature age.

Having obtained the animal of proper form, the swine should be properly educated and well supplied with material for the manufacture of fertilizers for the growing crops.

However often fed, the swine should have a clean trough and be taught to eat all that is given him at each time.

For hours of sleep and rest they should always, in cool weather, have a clean, dry and warm place of resort; in warm weather they should have a damp and cool place of retreat, or have water thrown upon them. They should be freely supplied with muck, straw or other material, and if enough be furnished they may be expected to make three cords each in eight months, worth on the farm five dollars per cord.

The three Chester County pigs belonging to Mr. Calvin Cham-

berlain of Foxcroft, were entered only for exhibition, six being necessary to a premium. The committee hope these pigs may be purchased and carried into different parts of the State, as their value can only be duly appreciated by further acquaintance.

The Committee award the Society's premiums, as follows:

For best boar of large breed, which, when fattened at mature age will weigh not less than 400 lbs., to W. A. P. Dillingham, Sidney, for Chester.

Second do., to Thomas Haston, Portland.

For best sow, do., to Jotham Weston, Bloomfield, for Chester.

Second do., to W. A. P. Dillingham, Sidney.

For best boar under two years of age, to Jotham Weston, Bloomfield, for Chester.

For swine of small breed, which, when well fattened at mature age, will weigh less than 400 lbs., first premium to G. H. Bailey, Westbrook, for Cumberland County.

Second do., to H. L. Clark, for Grade Suffolk.

For best litter of pigs, of any breed, not less than six, to Jotham Weston, Bloomfield, for Chester.

Second do., to M. W. Mosher, Gorham, for Grade Suffolk.

Poultry.

For best flock of hens exhibited, not less than fifteen in number, statement of profit to be made, to Purrington & Bailey, Westbrook.

Second best, to Timothy Kelley, Westbrook.

Third best, to W. Jordan, Yarmouth.

For best flock of turkeys, not less than ten in number, statement of profit to be made, to Purrington & Bailey of Westbrook.

For best pair of guinea fowls, to P. H. Holmes of Winthrop.

For best fancy lot of fowls, to include also pigeons and rabbits, to P. H. Holmes of Winthrop.

Mr. Holmes submits the following statement:

The coop of poultry to which I call the attention of the committee, contains the following varieties.

1. *English Red Caps.* These are a compact, energetic breed of hens, of medium size and handsome plumage. The cock has a

very large double comb, and hence the name of Red Caps given them.

I consider this a valuable and profitable breed as they are great layers—seldom setting. One of these when a year old laid 285 eggs during a year, which were worth one cent apiece—$2,85. A gill of corn per day, for that time was enough to satisfy her hunger. This would be one bushel and three quarts; worth, say, $1., which will leave $1,85 profit in favor of Biddy.

2. *Buff Shanghai.* These are a variety of the Asiatic Breeds. They are tall, heavy clumsy fellows—very good layers, and if kept from mischief are profitable as layers. They are strong for scratching and will throw up a whole hill of corn at one dash of the foot. They are also great foragers in a garden, and will pick your tallest peas and pole beans without flying up from the ground. They are principally valuable and profitable as setters and mothers. I have known one to set contentedly six weeks on a brick-bat.

3. *Brahma Pootra.* These are also a variety of the Asiatics, differing little from the Shangais except as to color, which is a yellowish white, intermixed on the neck and wings with stripes of black. The statement, in regard to their profit as layers and setters, of the Buff Shangais will apply to them.

4. *Creoles, or Bolton Greys.* These are a small compact variety, prettily marked with black spots on a white ground. They are hardy, come to maturity early, and are profitable, principally, as layers—good setters and faithful mothers, but not so profitable in the market when fatted as some larger varieties.

5. *Sebright Bantams.* These are the *dolls* and the Tom Thumbs of the poultry yard. They are very small in size, but large in feeling, and never knock under to any of their larger brethren until compelled to by superior force. They are, in fact, *Young America* in feathers. Their principal profit is in raising them to sell as pets.

6. *Grey Dorkings.* These were received as such from John Giles, Esq., of South Woodstock, Conn., well known as an experienced breeder and connoissieur. The Dorkings stand A, No. 1 as layers and mothers, and for excellent flesh when fattened for the market.

7. *Guinea Hens.* These birds are handsome of feathers, active and hardy, but excedingly noisy—not very mischeivous.

It is said that hawks are so annoyed by their *clamor* that they give a "wide berth" to any premises where they are heard. I suppose they are kept for this purpose, on the principle inculcated by Solomon, that "a loud scolding woman shall be found to drive the enemy away." They are good layers, but very sly in selecting their nests, and often forsake it if discovered. They are not very valuable for the table; principally profitable to sell as "*hawk scarers*," and as curiosities of the poultry yard.

8. *Fan Tail Pigeons.* This variety of pigeons are much prized for their tameness and docility. They cannot fly very well, and are therefore petted and caressed by children as pets. They are very pretty birds, but distinguished mostly, like some other beauties, for the *spread of their crinoline.* The principal profit of them is in raising to sell to fanciers.

9. *Bremen Geese.* In connection with the above I exhibit for premium a coop of six Bremen geese. These are pure bloods, direct descendants from the importation the late Samuel Jacques, Esq., of Ten Hills Farm, Somerville, Mass., from whom the parents of this stock were obtained. They are large, sometimes weighing 20 pounds and more when dressed. Always of a silver white color, and are undoubtedly descended from the Silver Geese that saved Rome from destruction by their timely squaking. These are profitable for their feathers, which are plucked once or twice per year, and for the market when fattened. The young for the first two months, are subject to many diseases and casualties which cuts in sometimes severely on the profits, but after they are a year old, they are hardy and generally long lived.

P. H. Holmes.

Winthrop, Kennebec County.

Dairy Products.

For greatest average amount of butter per cow, from three or more cows in June, July and August, to Charles C. Hurd, Exeter, for 292 pounds from three cows—97 pounds each.

Second premium to Ezekiel Holmes, Winthrop, for 255 pounds from three Jersey cows, on grass only—85 pounds each.

Third do., to Horace Jose, Dexter, 1,338 pounds from 17 cows—78¾ pounds each.

For greatest average amount of cheese per cow from three or more cows, from 20th June to 20th August, to Wm. Grinnell, Exeter, for 608 pounds from four cows, or 152 pounds each in two months.

Second do., to A. L. Barton, Dexter, for 2,542 pounds from 19 cows in two months, or 133 13-16 pounds each.

For best lot of butter, 20 pounds or more, to Charles C. Hurd, Exeter.

Second do., to Mrs. Wm. Warren, Scarboro'.

Third do., to Mrs. Wm. Varney, Windham.

Fourth do., to Miss Abby E. Wood, Winthrop.

Fifth do., to Mrs. E. Holmes, Winthrop.

For best cheese, 30 pounds or more, to Mrs. A. Weston, Litchfield.

Second do., to Miss Abby E. Wood, Winthrop.

Third do., to Miss L. Jackson, Paris.

Fourth do., Mrs. Lewis Wood, Winthrop.

Fifth do., to H. Sturdevant, Cumberland.

For best butter by girls under 16 years of age, to Miss Ann K. Adams, of Gray, 11 years of age.

Second do., to Miss Mary E. Adams, of Gray, 13 years of age.

Third do., to Miss Cora A. Barton, Dexter.

For best cheese by girls under 16 years of age, to Miss Laura A. Metcalf, Litchfield.

Second do., to Miss Mary Grinnell, Exeter.

Third do., to Miss Cora A. Barton, Dexter.

Fruits.

For best twelve varieties of apples, twelve specimens each, named and labelled, to E. P. Weston, Gorham.

Second best, to Samuel F. Perley, Naples.

For best dish of apples, twelve of one variety, named and labelled, and in eating condition, to F. Yeaton, New Gloucester.

Second best, to Russell Eaton, Augusta.

Third best, to Edwin Coburn, Gorham.

For best bushel of winter apples, one variety, to F. Yeaton, New Gloucester.

For best dish of pears, twelve of one variety, named and labelled, and in eating condition, to James Hirdle, Portland.

For best three foreign varieties, grown under glass, three bunches each, named and labelled, to J. C. Weston, Bangor.

For best three varieties of American origin, grown in open culture, three bunches each, named and labelled, to S. L. Goodale, Saco.

Sewing Machines and Scales.

The Committee appointed to examine sewing machines and scales, under Class 3, machinery, say:

F. P. Canfield, two sewing machines, made by Gray & Grace. One, a large machine, shuttle-stitch, well contrived and easily kept in repair. The construction for the different motions required, for the eccentrics, forming the loop, &c., very simple and effectual. Shuttle passes across the seam. Price, $45. The other, a small machine, double thread, equally simple with their shuttle machine, makes even and rapid work. Runs light and easy—Grover & Baker stitch—straight feeders. Excellent and low priced machine. Sold at $30. Diploma.

W. J. Thorn, Westbrook, sewing machines, made by Williams & Orvis. Double-thread machines, Grover & Baker stitch, and improved upon, as claimed by the inventor. Has a very simple and ingenious contrivance for holding and feeding the work. Rubber friction wheel, instead of a band. Sews from two spools. The lower side of the stitching was close and smooth. Price, $25. Diploma.

John Howe, Jr., Brandon, Vt., and *Frank E. Howe*, 203 *Broadway, N.* Y., three grocers' scales, one four ton hay and cattle do., one drop lever scales. These scales are simple and effectual, accurate and durable. Check rods are not used. Injury to the lever bearings from jostling and vibration is avoided by the platforms resting on balls in cups. The large scales do not require any pits to receive the apparatus. Can easily be set, free from frost and at

less expense than others require. They weigh equally well when out of level. We consider them the best scales in use. Medal.

Otis Whitney, Augusta, two of Weed's sewing machines, shuttle stitch. Appears to be a very good machine, and adapted for heavy work; hemmer attached, but did not see it in operation to judge of its merits; stitch shows the same on both sides. One of the machines was for light work. These machines were not in good working order, but they are extensively used, and give good satisfaction.

Diploma.

E. Shaw & Co., Portland, sewing machine, by Wilcox & Gibbs. Single thread machine; quick action and easily managed. Is a permanent and durable machine. Has a single and double hemmer attached. Has a simple and effectual contrivance to prevent balance wheel from turning backward; vibrating feed. Well made machine, and good for light work. The large machine was by Leavitt & Co. Double thread, shuttle stitch, circular feeder. Equally good for light or heavy work, readily adjusted, even stitch and both sides alike. Best machine for heavy work presented. Price, $65.

Medal.

Hall L. Davis, Portland, a Wheeler & Wilson sewing machine, for exhibition only. These machines are so well known, in so extensive use, and have been so often awarded upon, that any notice on the part of the committee would be superfluous. They are the standard for comparison.

The committee are entirely at a loss to make a comparative estimate of the value of the sewing machines. A great deal of ingenuity has been displayed upon these machines, and each of them is a wonderful piece of mechanism. Each of them works well, and any one would be satisfied with the work they perform. Each have their excellencies, but it seems presumptuous to say wherein, as a whole, one is really better than another.

The shuttle machine presented by Shaw & Co., was most satisfactory for heavy work.

The double thread machine presented by Canfield was most satisfactory for light work.

Wm. Senter, *for Committee.*

Grains.

Premiums were awarded on specimens of grains as follows:

For best bushel winter wheat, to Ira Winn, Portland.

Second best, Lewis Wood, Winthrop.

For best bushel spring wheat, to Reuben Hobbs, Harrison.

Second best, to John Titcomb, Jr., Farmington.

For best bushel of Indian corn in ears, to John F. Anderson, South Windham.

Second best, to Ira Winn, Portland.

For best bushel barley, to Chas. Hunnewell, Windham.

Second best, to Chas. Hunnewell, Windham.

For best bushel oats, to Nelson Haskell, Poland.

Second best, Chas. Hunnewell, Windham.

For best peck early peas, to Wm. Grinnell, Exeter.

For best half bushel field beans, J. A. Larrabee, Portland.

Crops.

Among the statements on crops are the following:

Wheat. T. H. Norcross of Charleston, Penobscot Co., applies for premium on best acre of spring wheat, and says:

"My crop consisting of 51 28-32 bushels of 64 11-16 pounds to the bushel, was grown on one acre. The soil upon which it grew was a fine brown loam, friable, with some small stones, very few large enough to require an iron bar to remove them. The land had been in grass 12 years, and did not yield more than 500 of poor hay to the acre. The last of May, 1858, hauled on 42 loads (one-half cord each) of yard manure, muck, straw, and the droppings of the cattle during the winter; spread, and plowed 10 inches deep, and harrowed well; and sowed 4 bushels oats, used them for fodder—equal to two tons of good hay. In May, 1859, hauled off the rocks, and cross-plowed 10 inches deep with a large plow; harrowed well, and then put on 40 loads of manure, as above, then harrowed, and plowed a second time, and planted with corn, with a large shovelful of choice manure in a hill. Crop large, as noted in "Goodale's Report" for 1859.

April 20, 1860, plowed, harrowed three times; plowed second time, then harrowed four times. April 25th, sowed one bushel and 28 quarts (well washed and dried with ashes) wheat, "Russia Club." The seed was obtained of a friend, who received his from Washington. Then harrowed four times—making in all eleven

times harrowing with boy and horse. Harvested about the 20th August, 51 bushels and 28 quarts of wheat, weighing 64 11-16 pounds to the bushel."

Dr.	*Crop of Wheat.*		Cr.
To plowing 1 1-2 days,	$3 00	By 51 28-32 bushels	$103 75
Harrowing,	3 00	Two tons Straw,	8 00
Sowing,	25	Manure left in soil for future crops,	
Other cultivation,	1 50	*estimated*,	7 50
Harvesting,	8 00		
Threshing and cleaning,	8 00		$119 25
1 7-8 bushels Seed,	4 00	Deduct cost,	47 75
Manure left in soil from former crop,	15 00		
Interest on Land	5 00		
	$47 75	Profit,	$71 50

Reuben Hobbs of Harrison, Cumberland Co., says:

"My crop consisting of forty bushels of 63 pounds to the bushel, was grown on one acre. The soil upon which it grew was yellow gravelly loam, formerly very rocky, about eighteen inches deep—fine, light and friable Sub-soil is yellowish, hard and gravelly. First broken up to a depth of eight or nine inches in the spring of 1859; then harrowed thoroughly; furrowed and dressed in the hill with four cords hog manure made the previous fall and winter; and planted with corn, from which a crop of ninety bushels of ears were raised. All sound corn. No top dressing being used. A cart-load of pumpkins was also raised at the same time. About the 12th of April, 1860, I carted on about three cords heap manure, made the previous winter; spread it, and plowed it in four or five inches deep; sowed one and a-half bushels wheat, broadcast, after washing it slightly, and drying it off in plaster. The seed used was 'Scotch Fife,' and was harrowed in lightly. The crop was reaped the 7th of August, in a well ripened state; bound up and got in the same day, and threshed by a machine about the 20th of August."

Dr.	*Crop of Wheat.*		Cr.
To Plowing 1½ days, with two horses,	$1 00	By forty bushels, at $1,75	$70 00
Three cords barn yard manure,	9 00	One ton Straw,	4 00
Carting and applying the same,	1 12	Manure left in soil for future crops,	
Harrowing,	1 00	*estimated*,	7 00
Sowing,	12		
Harvesting and housing,	3 00		$81 00
Threshing and cleaning,	6 50	Deduct cost,	32 64
1½ bushels seed,	3 00		
Manure left in soil from former crop,	6 50		
Interest on land, at $20 per acre,	1 20		
	$32 44	Profit,	$48 56

Statement of Andrew W. Russell, of Howland, Penobscot Co.:

"My crop, consisting of 187 bushels of 63 pounds to the bushel, was grown on five acres forty rods, being at the rate of 37 126-315 bushels of 60 pounds to the acre. The soil upon which it grew was

alluvial or interval of dark color, being almost entirely decomposed vegetable matter, with very little clay or fine sand, but no stones, gravel or coarse sand; this character of the soil continues to the depth of from six to ten feet, where it rests upon what was the bottom of the Piscataquis river, upon the north bank of which is this field. This land was originally covered with very heavy maples, birch, oak, elm and basswood growth, and was cleared more than forty years ago. It is said to have been an Indian camping ground. Since 1820 it has been in grass most of the time, yielding good crops, but being occasionally ploughed and cultivated, it has given heavy crops of wheat, oats, potatoes, &c., with very little or no manure. The grass sod was turned under eight inches deep in May, 1858, and immediately sowed to oats, which attained an immense growth, but rusted and lodged badly, and yielded but 42 bushels of light oats to the acre, while it gave promise of more than 50 bushels. Immediately after the oat crop was taken off, the ground was ploughed eight inches deep, and in April, 1859, 3½ acres was sowed to peas, and oats and peas, without manure; and in May two acres were planted to potatoes, with 40 common cart loads of barn-yard manure ploughed in four inches deep. These crops were very fine, the potatoes yielding 350 bushels to the acre, and the peas, and oats and peas, very heavy.

Immediately after these crops were taken off, the ground was ploughed about six inches deep, (say in Sept or first of Oct.,) and 50 loads common unrotted barn-yard manure spread on that part sowed to oats and peas and to peas, and not manured in the spring, and harrowed in. On the 25th April, 1860, sowed broadcast ten bushels Canada club wheat and 75 bushels clover chaff. I harrowed and rolled the ground with heavy roller. That part of the field upon which was grown the peas alone gave much the best crop, but was some three or four days later in ripening. There was very little difference in the oat and pea ground and the potato ground, but the potato ground was a little the best.

The crop was harvested (cradled and shooked) between the 24th day of Aug. and 1st Sept., and threshed and measured the 20th Sept, being thoroughly seasoned and fit for grinding.

Crop of Wheat.

Dr.		Cr.	
To plowing once, 2½ days,	$7 50	By 187 bushels at $2 per bushel,	$374 00
12 cords barn-yard manure,	36 00		
Carting and applying the same,	5 00	Straw,	30 00
Harrowing and rolling,	5 00		
Sowing,	1 00	Manure left in soil for future crops, estimated,	20 00
Harvesting and housing,	30 00		
Threshing and cleaning,	30 00		
10 bushels seed,	20 00		
			$424 00
Manure left from former crop of potatoes, two acres,	10 00	Deduct cost,	144 50
	$144 50	Profit,	$279 50

Statement of E. R. French of Chesterville, Franklin county:

"My crop consisting of 55 bushels of 61 pounds to the bushel, was grown on 1 3-4 aces. The soil upon which it grew was gravelly and sandy loam, and I made the following experiment, with the results herein stated.

One-half of the piece was manured and plowed last November, and the remaining half in April; the whole piece being manured and plowed as nearly alike as could well be done; and sowed the same day, May 1st, 1860. The result was that the wheat on the fall-plowed, was three days earlier through the entire season; was three to four inches taller; withstood the drouth better; was of a darker green, distinguishable a half mile distant; and on threshing the crop, the fall-plowed with enough of the spring-plowed to make an acre, yielded 33 bushels; and the remaining three-fourths acre, spring-plowed, 22 bushels; the fall-plowed exceeding the spring-plowed by about five bushels to the acre.

Our uniform method of culture is, to plow in fall or spring—in this case in spring—10 inches deep, spread on to the greensward from two to three cords of green manure to the acre, then furrow and plant with corn, putting into the furrow about five cords of old compost manure. The green manure is thoroughly worked in with harrow and cultivator. In preparing for wheat we first split open the hills with a double mould-board plow, then spread on three cords more of green manure, and harrow *across* the rows well; then plow five or six inches deep, and harrow once for sowing, and twice after.

The ground on which my wheat was grown, was prepared in the above manner. Harvested August 18th to 20th.

Dr.	*Crop of Wheat.*		Cr.
To plowing twice, three days,	$6 00	By 55 bushels at $1,50, . .	$82 50
Six cords barn-yard manure, .	18 00	Three tons Straw, . . .	15 00
Carting and applying the same,	4 00	Manure left in soil for future crops,	
Harrowing, ...	1 50	*estimated*, ...	20 00
Harvesting, ...	4 00		
Threshing and Cleaning 55 bushels,	8 00		$117 50
Three bushels Seed, . . .	6 00	Deduct cost, ...	65 00
Manure left in soil from former crop,	12 00		
Interest on Land, . . .	5 00		
	$65 00	Profit, ...	$52 50

Statement of John Titcomb, Jr, of Farmington, Franklin Co.:

"My crop, consisting of 131 11-32 bushels of 63½ pounds to the bushel, was grown on four acres sixty rods, being at the rate of 30 bushels to the acre. The soil upon which it grew was a sandy loam, mellow and deep, a few stones in places, situated on a southern slope well drained by nature. Distance to subsoil 18 inches. Corn crop taken off last year, the ground having been manured with 10 cords of stable and yard manure—5 cords spread on previous to plowing, and an equal amount applied in the hill. No manure ap-

plied the present season. Ground plowed Nov., 1859; harrowed the 14th and 16th of April; sown, broadcast, 17th of April. The wheat was washed in soap suds—3 quarts of dry slaked lime and 15 lbs. of plaster to the bushel, well mixed with it. The quantity of seed 1 3-4 bushels to the acre. Kind of seed, Canada Club. Harvested from the 3d to 12th of August.

Dr.	*Crop of Wheat.*	Cr.
To plowing once, . . . $10 00	By 131 11-32 bushels, at 10*s*, . $218 40	
Harrowing and rolling, . . 7 50	4½ tons straw, at $3, . . . 13 50	
Sowing and washing, . . . 1 50	Manure left in soil for future crops,	
Harvesting, ... 13 00	estimated at 16 50	
Housing and stacking, . . 3 00		
7½ bushels seed, ... 15 00		$248 40
Manure left in soil from former crop, 33 00	Deduct cost, ... 100 00	
Interest on land, . . . 12 00		
Threshing, ... 15 00		
$100 00	Profit, ... $148 00	

Statement of Lewis Davis of Readfield, Kennebec County, on Winter Wheat:

"My crop, consisting of 39 bushels of 63 pounds to the bushel, was grown on 1 acre 20 rods, being at the rate of about 35 bushels to the acre. The soil upon which it grew was a clayey loam, broke up about the 10th of May, 1859, 9 inches deep. I spread upon the grass about 3 cords of green manure on a part of it and turned it under, and when I planted my corn, about the 15th of May, I spread about 3 cords of compost manure upon the part that had not been manured, and cultivated in. I then furrowed it deep, and manured it with one shovel full of hog manure in hill; covered the manure before dropping the corn and potatoes; hoed it three times, dug my potatoes, which grew upon 60 square rods, and sowed wheat the 9th of Sept. Cut up my corn Sept. 14th, and carted it off, and sowed the wheat Sept. 17th. Ploughed the corn ground with a single horse and small plough, sowed wheat, cultivated it in, and then harrowed the ground, it being 120 square rods, or 3-4 of an acre, upon which I raised a good crop of corn. Clayey loam and no stones; upon some parts of it I turned up some clay, upon other parts black soil; about ten inches to the clay. I cut about a ton of hay to the acre the year before I broke it up; the crop raised before the wheat was corn upon 120 rods, and potatoes upon 60 rods. The manure upon the corn ground as stated above; the potato ground was manured in the hill with green manure. Corn planted May 15th and 17th; potatoes planted April 29th. The corn plantedwas the Dutton twelve-rowed. The wheat sowed was the Banner, or the white-blue stem, at the rate of two bushels to the acre, washed and mixed with plaster, and two bushels of salt to the acre. The wheat was reaped about the 20th of July, when it was quite green, bound up, stood up in bunches, about a dozen small bundles together, and capped until it was dry. It was threshed with a flail.

Barley. Statement of T. H. Norcross of Charleston, Penobscot County:

"My crop, consisting of 56 13-32 bushels of 53 pounds to the bushel, was grown on one acre. The soil upon which it grew was a loose, yellow, loamy, fine, friable soil, broken up in the spring of 1858 ten inches deep; spread on six cords of barnyard manure; harrowed well, and sowed 3 1-2 bushels oats about the middle of May. Got a large crop, but was absent when harvested, and threshed by odd jobs, so I don't know how many I got. In 1859, I cross-plowed in May ten inches deep; put on ten cords of good manure; harrowed well: then plowed again and harrowed down smooth; hauled a chain 3 1-2 feet apart, and planted five bushels of large Jackson potatoes, cut in small pieces one foot apart. Raised 367 1-2 bushels.

Last spring, 1860, plowed the ground six inches deep; harrowed well, and cross-plowed the same depth and harrowed again; and the 27th of April sowed two bushels of two rowed barley, from which I threshed 56 bushels and 13 quarts, weighing 53 pounds to the bushel.

The depth to the sub-soil is about one foot. The seed was washed and dried with ashes. Mowed and raked the crop August 14th.

Statement of T. J. Twycross of Dresden, Lincoln County:

"My crop consisting of 40 bushels of 45 pounds to the bushel, was grown on one acre, 10 rods, being at the rate of 37½ bushels to the acre. The soil upon which it grew was clayey loam, mellow, level, and free from stones, rather dark, loamy, fine, about 18 inches to the sub-soil. Several years in grass, last two years in corn. Manured with barnyard manure, ploughed in. No manure applied this year. The time of sowing was May 5th—the common two rowed barley. No previous preparation or soaking: no top dressing of any kind used. Cut August 3d, the stalks quite green. Ploughed a few days before sowing about six inches deep.

Statement of E. R. French of Chesterville, Franklin County:

"My crop consisting of 22 bushels, was grown on 58 rods, being at the rate of sixty bushels to the acre. The soil upon which it grew was a yellow loam, had been planted to potatoes, corn, and turnips for three years previously, and had been manured with green manure at the rate of three cords to the acre for three years previously, and a part of it was manured in the hill last year at the rate of five cords to the acre. It was manured with green manure as in previous years the last spring, and thoroughly cultivated in; and one bushel of two rowed barley sowed April 21st, and harvested the 1st of August.

Indian Corn. Statement of Nelson Haskell, of Poland:

"My crop, consisting of 88 1-6 bushels of 56 pounds to the bushel, was grown on one acre. The soil upon which it grew was yellow loam, inclining to the south, about three feet deep, and quite stony. The land was broken up in the spring of 1859, planted to corn, manured in the hill with two cords of barn-yard manure, and plastered. The following spring twenty-one loads of muck and barn manure, of one-third of a cord each, were spread broadcast on the ground, and ploughed in about nine inches deep, then harrowed and cultivated the whole till five or six inches of the surface had come to a fine tilth, believing that it is important to have the ground thoroughly pulverized for the reception of all seeds. The ground was then furrowed in a southwest direction, three and a half feet apart. Three cords of muck, hog and barn-yard manure was applied in the furrows, about two feet apart; then covered it up with loam, and pressed it down; then dropped four bushels of plaster and ashes, (one-third ashes,) well mixed; then dropped about one-third of the piece with four or five kernels to the hill, the remainder separated the kernels, dropping three kernels in a place about six inches apart, which was the best corn Planted the 23d and 24th of May. Used the large variety of eight and twelve-rowed seed. Hoed and cultivated twice. Harvested Oct. 25th.

Statement of J. W. Colby of Denmark, Oxford County:

"My crop, consisting of 86½ bushels, was grown on one acre. The soil upon which it grew was light loam, (stones mostly removed) of a redish brown color, one foot deep, fine and friable, hard, gravelly subsoil. Raised on sward land that had previously been to grass four years, and cut one ton of hay to the acre the year before I plowed it up. Used 6½ cords of manure kept in the barn cellar; spread and harrowed into the soil. Planted the 15th and 16th of May, 20 quarts of seed to the acre. Eight-rowed seed planted. Rows three feet apart, hills two feet. Ploughed in the fall of 1859. Corn planted dry, without soaking. No top-dressing. Used about one spoonful of plaster in each hill. Harvested from 15th to 18th of October."

Statement of Wm. Grinnell of Exeter, Penobscot County:

"My crop, consisting of 135 bushels of ears, was grown on one acre, being at the rate of 67 bushels shelled corn to the acre. The soil upon which it grew was a fine gravelly loam of a yellowish color, 15 inches deep, on coarse gravelly subsoil. It was planted with potatoes the last year, without manure. Was plowed in the fall and manured on an experiment, as by a circular sent out by the Secretary of the Board of Agriculture, viz: To divide the acre into fourths, and manure as follows:

1. 3 cords green manure from the barn cellar, spead and ploughed in eight inches deep—crop, 32 bushels of ears. 2. 3 cords, and ploughed in four inches deep—crop, 33 bushels of ears. 3. 3 cords harrowed in—crop, 34 bushels of ears. 4. 3 cords spread on the surface—crop, 36 bushels of ears. Manured in the hill with manure scraped up in the yard—7 cords.

Oats. Applications for premiums on oats were made by Nelson Haskell of Poland, for crop of 60 bushels per acre, and by T. J. Twycross, Dresden, for crop of 56½ bushels per acre.

Root Crops.

First Premium on potatoes to Andrew W. Russell of Howland. His statement is as follows:

"My crop consisting of 358 bushels of 61 pounds to the bushel, was grown on one acre, being at the rate 364 bushels (60 lbs)to the acre. The soil upon which it grew is alluvial or intervale, principally vegetable deposit or mould of a dark color, with a slight portion of clay, but very light and easy of cultivation when dry. No stone, gravel or coarse sand in the soil until a depth of from 6 to 10 feet is reached, when the original bottom of the Piscataquis river is found, upon the north bank of which is the field referred to. This land was originally covered with a heavy growth of maple, birch, elm, oak and basswood. Cleared more than forty years ago. Since which it has usually been in grass, yielding heavy crops, but occasionally being ploughed and cultivated with very little or no manure. The crops heretofore cultivated have been wheat, oats, potatoes, etc., always yielding good crops. This acre was broken up from grass, the sod being turned in 8 inches deep, in October, 1859. In April and the very first days of May last, there were 25 common cart loads of unrotted barn yard manure spread on the acre, and worked into the surface with cultivator and harrow. Then planted 18 inches apart in rows, just 3½ feet apart in furrows 4 inches deep. Covered with the hand hoe. Hoed twice after the cultivator, and such large weeds as appeared afterwards were pulled out by hand. The crop was harvested in the common manner with hand hoes, between the 18th and 25th of September. The kind of seed used was the Orono and State of Maine. It was cut small, never more than two eyes on a piece, and dropped two pieces in a place. There was not more than 10 or 12 missing hills on the piece. This land is upon the farm of William C. Hammatt.

DR. *Crop of Potatoes.* CR.

To Plowing once, ½ day,	$2 00	By 364 bushels at 25 cts.,	$91 00
Seven cords barnyard manure,	20 00	Manure left in soil for future crops, estimated at,	10 00
Carting and applying the same,	3 00		
Harrowing,	50		$101 00
Furrowing and Planting,	3 50	Deduct cost,	48 50
Cultivating twice and Hoeing twice, five days,	5 00		
Other cultivation and weeding,	50		
Harvesting,	7 00		
Twelve bushels Seed,	4 00		
Interest on Land,	3 00		
	$48 50	Profit,	$52 50

Second premium on crop of potatoes to C. H. Durrell, Paris. Statement:

"My crop, consisting of 325 bushels of 60 pounds to the bushel, was grown on 1 acre. The soil upon which it grew was a fine loamy soil of a brownish color, depth about 16 inches; was ploughed about 8 inches deep; some parts of it a little ledgy. In 1858 the ground was broken up and planted to corn, with a light coat of manure. In 1859 I sowed it to wheat, without any manure. In 1860 I spread on 13 loads of manure from the barn windows, and put eight loads of old manure in the hill, and planted my potatoes the 19th of May; planted 13 bushels of the white Laplands: hoed them once the 20th of June; dug middle of October.

Ruta Bagas. First premium on half an acre to Obadiah Whittier, Vienna. Statement:

"My crop, consisting of 345 bushels of 60 pounds to the bushel, was grown on 80 rods, being at the rate of 690 bushels to the acre. The soil upon which it grew was heavy loam, moderately stony. The ground had been mowed ten years, during which time it had received no dressing of any kind, and had become so bound out that it did not cut one half a ton to the acre. The soil is about 12 inches deep, rather stiff; the subsoil is a clay pan of such a texture as does not admit the free passage of water.

I applied two cords of green manure spread on the sward, and turned under, then two cords more, same kind, to the furrow, and harrowed in. I furrowed three feet apart, and applied three cords manure to the hill, three feet from centre to centre. Manure applied to the hill manufactured by the Bommer method. I then level with a hoe or the foot, spreading it on the furrow so as to admit of two hills in one dropped ten inches apart, so the hoe will work between them. When thinned leave two or three in the hill. I plant the 10th of June. I applied two bushels plaster, and two cwt. bone meal.

The cost of growing the same and its value are as follows:

Dr.	*Crop of Ruta Bagas.*		Cr.
To ploughing once, ½ day,	$2 50	By 345 bushels, at 13c per bush.,	$44 85
4 cords barn-yard manure,	5 00	I estimate the one-half acre $10 at least better than before ploughed,	10 00
3 cords other manure,	3 00		
Carting and applying the same,	1 00		$54 85
Harrowing and ridging,	75		
Furrowing and sowing,	2 00	Deduct cost,	26 00
Cultivating once, hoeing and thinning,	4 00		
Weeding,	1 00		
Harvesting,	3 00		
2 bushels plaster,	75		
2 cwt. bone meal,	3 00		
	$26 00	Profit,	$28 85

Second Premium to A. W. Jordan, Cape Elizabeth. Statement:

"My crop consisting 350 bushels of 60 pounds to the bushel, was grown on one acre. The soil upon which it grew was sandy loam with small stones. Have grown potatoes on this piece of land for eight years previous which have been harvested from 15th July to 1st of August, after which time have sown English turnips and have had good crops.

The manure this season was put in hills 2½ by three feet apart—about eight cords to the acre, composted of equal parts stable manure and swamp muck with two cords seaweed. The turnips were planted between the hills at last hoeing in the latter part of June.

Dr.	*Crop of Ruta Bagas.*		Cr.
To sowing,	$1 00	By 350 bushels, at 40c,	$140 00
Cultivating 3 times,	1 50		
Hoeing once, 4 days,	4 00		
Other cultivation and weeding,	2 00	Deduct cost,	24 50
Harvesting,	6 00		
Manure left in soil from former crop,	10 00		
	$24 50	Profit,	$115 50

Onions. Premium on ½ acre to Cyrus Wheeler of Waterville. Statement:

"My crop, consisting of 200 bushels, was grown on one-half acre, being at the rate of 400 bushels to the acre. The soil upon which they grew was deep, mucky and rich, a sort of made land; has the appearance of having been at some time the bottom of a swamp or swale. It was of a dark chocolate color, some two feet to the subsoil, and was fine and very friable: the subsoil is a hard clay. I have raised onions on the same land two years previous to the present, or on the largest portion of it, and the crop was much the best where it had been planted to onions before. I applied a compost of stable, sheep and barn-yard manure, mixed with equal portion of muck, with some night soil, about six cords to the half acre, and was careful to have it well intermixed with the soil by

several plowings, and well harrowed or dragged, and the beds made in the fall previous; the ground back-furrowed into beds about 14 feet in width, and elevated about 18 inches; have the beds all ready for sowing in autumn; plant as soon as the ground is bare and dry enough to sow; sow with a drill machine, 14 inches apart in rows, 4 lbs seed to the acre, and the ground kept clear from weeds. The ground should descend to the south, and no shade allowed on the ground. Harvested from August to November, by pulling and drying.

The cost of growing the same and its value are as follows:

Dr.	*Crop of Onions.*	Cr.
To plowing 3 times, 2 days,	$4 00	By 200 bushels, $166 67
6 cords barn-yard manure,	30 00	Manure left in soil for future crops,
Carting and applying the same,	2 50	estimated, 10 00
Harrowing, rolling, ridging and sowing,	2 00	$176 67
Cultivating once, 10 days,	10 00	Deduct cost, 72 50
Hoeing twice, 14 days,	14 00	
Harvesting,	5 00	
Drying and housing,	1 00	
2 lbs. seed,	1 00	
Interest on land,	3 00	
	$72 50	Profit, $104 17

YORK COUNTY SOCIETY.

This Society held its Annual Exhibition at its grounds at Saco, Oct. 9th to 12th. The rain of Monday previous probably prevented so large a show of cattle as there would otherwise have been, yet it would compare favorably with other years, and there were finer animals of several breeds than have ever been before shown. The Ayrshire cows, heifers and calves of Mr. Hayes and Mr. Goodale, the Cotswold sheep of Mr. Jordan, the South Downs of Mr. Jenkins, were especially fine.

The exhibition at the Hall was very good. The vegetables and fruits excellent.

Among the premiums awarded were the following:

First premium on stallions, to John N. Stimson of Alfred.

First premium on breeding mare, to Asa Libbey of Limerick.

Second premium for do, to James R. Haley of Dayton.

For best Ayrshire cow and heifer, to Thomas M. Hayes of Saco.

A cow and calf of this breed were shown by S. L. Goodale, (not in competition for premium) which had taken first premium at the State Fair.

Second premium on milch cows to R. P. Tapley. Mr. Tapley says that the milk in the last week in June weighed 43½ to 46¾ lbs. per day. Since calving, made 152¾ lbs. of butter, besides supplying a family of eight persons with milk.

To Henry Jordan, Kennebunk, for best long wool buck, (a pure blood Cotswold, which brought $150 at the auction sale of Geo C. Hitchcock, New Preston, Conn.) Mr. Jordan also showed five fine ewes, from Mr. Hitchcock's flock.

To James G. Jenkins, of Elliot, for superior South Down bucks and ewes.

To Moses S. Milliken, for Suffolk boar.

To John Hanscomb, for Tuscarora boar.

To Wm. Sweet of Waterboro', for best breeding sow.

CROPS.

Indian Corn. First premium to Edward B. Randall, of Limington, for 152 bushels of ears on one acre.

To John Milliken, Buxton, for 155 bushels, of 57 lbs. per bushel, on 2 acres and 57 rods.

To Joseph Frost, Elliot, for 149 bushels ears on 170 rods.

To Ira Andrews, of Biddeford, for 60 bushels, of 58 lbs. per bushel, on 112 rods of land.

Wheat. To David Tuxbury, of Saco, first premium for 39½ bushels on 170 square rods.

To Moses S. Milliken second premium, for 38½ bushels white wheat on 1 acre and 16 square rods.

Potatoes. To Edward B. Randall, Limington, for 200 bushels on one acre.

One feature of the horse show at this place, may well be adopted by other societies. After the owners of family horses had shown their animals, they were put in charge of *ladies* and driven around the track, in order more fully to test their discipline, docility, and qualities generally. The occasion was one of much interest. The horses behaved with the utmost propriety, and fully sustained the reputation won by their previous exhibition and attested to in their certificates of "good moral character."

OXFORD COUNTY SOCIETY.

The Annual Exhibition of this Society, was held at Norway, on the 2d, 3d and 4th of October. The Secretary writes me:

"The first day of the fair was mostly devoted to entering and arranging articles for exhibition.

The second day was as fine as could be desired, and the number of visitors quite large, although not so great as at the fair of 1859.

On the third day, a rain storm seriously interfered with the exercises, and reduced the admission fees to a merely nominal sum.

There has been a decided improvement in farming generally, within the past ten years, and an interest appears to be manifested which is encouraging for the future.

The leading characteristic of the fair was the unrivaled exhibition of fruit. In the production of winter apples, it is believed that Oxford county stands among the foremost in the State. The crop has been unusually large the present year. The exhibition of fall apples and pears was also large, and of superior quality. Grapes and plums were shown in many varieties for this latitude.

The crop of wheat was much larger than it has been for many years. The corn crop was an average one, although there was no competition for the premiums offered.

The exhibition of horses and neat stock was good, and manifest improvement was visible.

The number of sheep and swine was not large, but good specimens of each were to be seen."

Mr. C. Chamberlain, who was designated as visitor to this exhibition, submits the following report:

S. L. GOODALE, ESQ., SECRETARY, &c.

Dear Sir:—While at Portland, attending to matters incident to the State Fair, I borrowed a day in which to comply with an arrangement made at the last meeting of the Board of Agriculture, to visit the Oxford county Society, at their eighteenth exhibition. I invited

John Reed, Esq., of Westbrook, to accompany me. In this, I had a twofold purpose; to see through his eyes as well as my own, all that should be seen—and to cull from an abundant store-house, ideas for my private use. He is a fortunate man who secures for a companion in a crowd, one who unites in his person the urbane gentleman, the man of large experience in business, and one not chary in expression.

We left Portland by the evening train on the A. & St. L. R. R., on Tuesday, the first day of the show, and proceeded to South Paris station; thence, by stage, to the village of Norway, passing the show grounds. This was my first visit to the county of Oxford.

Wednesday morning opened pleasantly, and at an early hour we walked over the smooth, sandy plain, that extends from the village eastward for two miles or more, a part of it being the "disputed territory," famous in recent history of Maine legislation. From this plain, we get a fine view of verdant hills in Norway, Paris and Oxford, realizing all that we had conceived the county of Oxford to be.

The spacious lot occupied by the Society, is bounded on its northerly side by the public road. The buildings connected therewith—a hall of two stories, an office and a hay barn—are each entered from the road. On the opposite side of the road is the unfenced plain, sparsely wooded, affording ample space for the teams of visitors to the Fair, and all the outside concomitants to such a gathering of the sovereign people. Within the park, the original pines have been retained on one side, under which are arranged the cattle pens. A glance at the enclosed grounds and its surroundings,—noting the character of the soil—with the easy distance to two large and thriving villages, shows advantages of location for all legitimate purposes, certainly not excelled by that of any other society.

At the entrance, we were met by the officers of the Society, welcomed, and passed to the exhibition. We were told that but little progress was made on the first day. The rain on Monday, with indications for a protracted storm, delayed the preparations of contributors, and we saw many articles and some stock then arriving.

We wished to see the book of Entries, but the Secretary not having closed it to applicants, we could not do so without clogging the course of business. The Secretary seemed to have his business well arranged, and was able to give prompt answers to the few questions

we thought proper to ask him. But two or three entries were made of *Full Blood* stock of any breed.

On entering the hall, we found on the first floor several ploughs made by T. Hersey, of Paris, and Brown & Bisbee of Norway; the last named showing also a swivel plough, and two patterns of cultivators. Here was also one well-made sleigh.

On one side of this room was set several firkins and jars of butter, and fifteen cheeses; also, specimens of thick and thin boots and leather.

On the other side were found Horticultural products; squashes of the good varieties, some pumpkins, potatoes, melons, &c., through the usual catalogue of the country kitchen garden. Beautiful traces of Indian corn, and some specimens of small grains here attested the bounties of the golden year. Passing to the upper hall, on one hand a table, some sixty feet in length, was piled with apples, pears and grapes, making a show creditable to any county in the State.

The fruit shown by Mr. Samuel Chadbourne, of Oxford, was particularly excellent, embracing thirty-six varieties of apples, eleven of pears and eight of grapes. The apples and pears were grown on young trees, and we were pleased to learn that Mr. C. keeps nursery trees for sale; for such a display of fruit is a sure guaranty for his faithfulness as a nurseryman.

Mr. Reed, of Norway, showed twenty-five varieties of apples; A. Watson, of Norway, thirty varieties; Col. Sweat, of Paris, forty varieties of grafted fruit; Orison Ripley, of Paris, sixty varieties of grafted apples. Dr. Brown, of Paris, showed thirty-six varieties of fall and winter apples, nine varieties of pears, three of grapes and one of plums,—a very good collection. A lot of six varieties of fall apples, by E. W. Clark, of Paris, were of enormous size for their kind.

Returning on the other side of the hall, a long table is spread with the usual display of ladies' handi-work; all of which we embrace in one general look, and we pass down to take a new observation and departure from the Secretary's office. We are here again told that entries are still making, and will continue most obligingly. We here found a printed programme of the doings for each day: but on making inquiries of several officers that we chanced to meet, we soon discovered that there was an air of exceeding uncertainty surrounding this day's proceedings, rendering it somewhat problematical

whether the prominent shows of the day might not elude our grasp altogether. Even the *Address*, that was set down for 9 o'clock, A. M., could not be vouched for at all—not even the *place* for its delivery—at a quarter to nine, by even the Hon. President himself.

We next entered the park, and there found the usual commotion incident to the first stage of these assemblages, where every man is for himself, and no good spirit invoked to care for the hindmost. Taking things in the order of place, we find six sheep pens, each with one or more sheep, all of the large breeds with long wool, showing more or less the type of the importation through Perley's flock, at Woodstock, N. B. We next found one solitary boar pig—a grade Suffolk. (Late in the day, we saw a sow with ten pigs had been brought into the park in a cart. No claim made for blood. A large breed, and of good appearance.) After passing a coop of social turkeys, we came to the long line of cattle pens. Passing down the line, we saw a Devon bull, three years old, of fair size and good points. Amos T. Holt shows a herd of sixteen head, a cross of Hereford and Shorthorn. E. R Holmes, of Oxford, showed a bull calf, three-fourths Hereford, from stock of Underwood, Fayette. Several pairs of oxen and steers, marked with a shade of the characteristics of the leading breeds of the State, of medium size, were noticeable here and there.

While looking at the cattle, we heard in the conversation between two intelligent gentlemen, the remark that this show was very meagre, compared to former ones; and that fifteen towns within their limits were entirely without representation. Looking at the geography of the county, and setting aside the towns embraced in West Oxford Society, the above statement being true, this show was drawn from no more than eleven incorporated towns.

The Address, announced in the programme for the day, was not presented in its order.

A business meeting of the Society was held at 10 o'clock. A committee was raised to nominate officers, and during their retirement for consultation, the Hon. John J. Perry, being called upon, proceeded at considerable length to speak pertinently to the general subject of agriculture. Gen. Perry had received an invitation to give the Annual Address on this occasion.

As an item of peculiar interest, a pair of yearling steers were on

the ground,—the same that were exhibited at Portland—remarkable for the perfection and quaintness of their discipline. They are owned and trained by Gilman Tuell, of Paris, aged 15. We joined the crowd, to witness their astonishing feats. They elicited much attention, and received merited applause.

The encouragement given for such exhibition, by the offer of premiums, has resulted in some cases in a degree of progress not anticipated by the managers of the societies. Both the boy and the steers are improved by the course of training for these exhibitions. These steers are taught to take many unnatural postures, and to perform feats so unusual, as to fix our attention and claim our admiration. Rarey never had a horse more completely under his control than young Tuell his steers.

We saw but few horses on exhibition. Judging from our standpoint, we entertain no immediate fears that the substantial interests which these annual gatherings are designed to promote will here be thrust out of sight, for a more ephemeral show of fast horses and fast men.

The Ploughing Match was had in a field on the sandy plain. The soil was a fine, yellow, sandy loam, exceedingly light, and a portion of it very nearly clean sand. Very little sod was upon it, though the roots of twitch grass were seen to permeate the whole field, though not very thickly set. The lands were marked by first furrows before being entered upon by the contestants. Each land contained about thirty square rods. Eight teams entered. All used the ploughs made in the immediate neighborhood, Paris and Norway. One party withdrew, after ploughing about half the task. This was on the lightest soil of the field. There was not sufficient weight and adhesiveness in the soil to enable the plough to cut the roots of the twitch grass. They accumulated on the cutting edge and suspended the work. The ploughing, we judged without taking actual measurement, was done about ten inches deep by twenty in width. The match passed off with commendable order. The selection of a heavier soil would have afforded a better test of acquired skill in holding the plough and managing the team; and more distant made ploughs of good repute, brought out by their owners and compared with these home favorites, would have added much to the interest and usefulness of the trial.

In giving expression to the impressions we retain concerning all we saw, should we fail in any case to render exact justice, we hope the interested reader will extend to us the broadest charity, in consideration that our notes were made in one short day; and that *one* charged with an unfortunate mixture of the work assigned to two days of the exhibition.

The officers of this Society, in their circular for the year, offered a list of cash premiums amounting to about $350—about $30 more than the list of the previous year.

Their code of general rules and regulations, is very like what we have met, founded on experience, and applicable to the management of much larger exhibitions than this.

Our Conclusions..

This Show, as an index of what Oxford is in her agricultural resources—of what her population is as an intelligent, laborious, producing people, probably fell much below what it should have been. The people themselves assembled, were to us the most interesting feature of the exhibition. The county of Oxford has furnished great numbers of sturdy men and noble women to people the newer counties of Piscataquis and Aroostook, and has been decimated to swell the western tide of emigration. Without a personal acquaintance in any of her towns, the inference is fair, that nearly all her present population is native on the soil.

At the late Mechanics' Exhibition, in Boston, a great many men and women were weighed by the exhibitors of scales. We saw the figures giving the average weight of more than twenty thousand persons. The same was done at the State Fair at Portland, holden at the same time. The average weight of men and women was found at Portland to exceed that at Boston by several pounds. At Paris, we remarked to our friend that Howe's scales here, would tell a story of physical development that would be worth more to the world than all other truths that could be written of Oxford and her products, for the year 1860.

The first end to be answered by the labor of the farmer, like all other labor, is to secure the means of living—the support and continuance of life itself. "Regarding existence as deriving its value

from the purposes it accomplishes, all efforts for its preservation and enlargement become justifiable and praise-worthy."

While we value life for its uses—for the enjoyment that can be had from it, from the good that may be done with it, we are stimulated to greater endeavors for its maintenance, and we rise to the cherishing of higher purposes in our toil; for there is a higher and nobler purpose to be served by every man's labor than to give him a mere living. "It should quicken his thought, enlarge his conceptions, exalt his aims, strengthen his character, and make him wiser, better, nobler." The highest aim resultant from every avocation is, *manhood* itself; a well developed, thoughtful, sympathetic, upright manhood—the full expansion of all the faculties of our nature. There is no calling in complex society, that is more favorable to a broad development of nature's powers, than that of the cultivator of the soil. It gives physical vigor, on which alone can the structure of a manly life be successfully reared to stand firm and permanent.

A large majority of the human family have their start in life on farms. Here they receive first impressions—here characters are formed. Here developes humanity physically, intellectually, morally. To the school of the farm, the world has ever looked for the highest type of human excellenne. This being true of the past, when art and science and taste shall have done their perfect work, what may we not expect in the future!

The county of Oxford has furnished her quota of those who have "made their mark" in the world. Favored, happy Oxford! with your present noble people—collectively representing the highest type of manhood and womanhood of the Anglo Saxon, be true to yourself and life's great interests, and your future will be glorious.

FOXCROFT, 1860. C. C.

Among the premiums awarded were the following:

To Wm. H. Woodbury, of Norway, for best stallion: to E. F. Stone, of South Paris, for second best do.

To Lyman F. Abbott, of Andover, for best Breeding Mare.

To A. A. Tufts, of Paris, for Devon Bull, bred by B. Heald, of Sumner, from stock brought from Vermont.

To S. W. Burnham, of Norway, for Hereford Bull.

To A. T. Holt, for Milch Cow, yield not stated.

To same for herd of cattle, a cross of Hereford and Shorthorn.

To Hiram Millett for best flock of Sheep, grade Cotswolds.

Dairy.

E. Maxim, of Paris, made 800 lbs. cheese, and 400 lbs. of butter, the past summer, from four cows and two 2 years old heifers—grade Durhams. His June butter he puts down in firkins lined with birch bark.

Fruit.

Thomas H. Brown exhibited about forty varieties of apples, nine of pears, three of grapes, and other fruits. The pears included Doyenne d' Ete, Beurre Diel, Beurre d' Amalis, Belle Lucrative, Duchess de Angouleme, &c., &c. The grapes were stated to be well ripened in the open air, and included Concord and Isabella.

Crops.

For best crop of wheat, to A. L. Burbank, of Bethel, 29½ bushels per acre, Canada wheat. Land in corn the two previous years, and well manured.

For second best, to John Parsons, of Paris, for 46½ bushels on four square rods less than two acres. Land in oats in 1858, and in corn in 1859. Red Turkey wheat, bearded.

To Gilman Chapman, Bethel, for best barley, 53 bushels per acre, (42 lbs to the bushel.) Land, clayey interval; 20 loads of green manure per acre.

Potatoes. First premium to C. H. Durell, of Paris, for 197 bushels on one-half acre. Land in corn in 1858, and wheat in 1859. The kind of seed not stated.

Second premium to W. L. Stanton, of Oxford, 222 bushels per acre, (white Lapland.) Land broken in September previous; a little gypsum in the hill, and no other manure.

Third premium to Ichabod M. Thomas, of Oxford, for 220 bushels per acre.

LINCOLN COUNTY SOCIETY.

The Secretary writes me as follows:

"This Society now embraces 1,150 members, 90 new ones having been added during the past year.

Its eighth Annual Exhibition was held at the city of Rockland, on the 2d, 3d, 4th and 5th days of October, and was almost a failure in the stock department, on account of the weather, it having rained every night, and three of the four days of the exhibition. The show in the hall was as good as it has been at any of the previous exhibitions, and to the ladies of Rockland the Society is especially indebted for the interest and zeal they manifested that the show in their department should compare favorably with former years.

To Mr. John Currier, of Waldoboro', the Society is largely indebted, for the largest and finest display of fruit that has ever been exhibited by any member of this society. It included about sixty varieties of apples, fifteen varieties of grapes; also a large variety of pears, gooseberries, currants, &c. The exhibition of fruit as a whole, was much the best we have ever had in this county.

W. S. Brown, *Secretary.*"

Among the premiums awarded were the following:

To Wm. H. Titcomb, of Rockland, for best stallion,—English.

" Nathaniel Cobb, of Warren, for best Breeding mare.

" Warren G. Williams, for second best do.

" Lewis E. Beals, of Dix Island, for best Devon Bull.

" Jackson Russell, of Waldoboro', for best South Down Buck, bred by O. Whittier, of Vienna.

" L. D. Carver, of Rockland, for best Boar.

" Walter E. Tolman, Rockland, for best Breeding sow, both of Columbia county breed.

The Secretary remarks as follows:

"There are very few Blood Animals in this county, being mostly crossed with the Devon or Durham, and some crosses of Jersey.

There has not been that attention paid to the rearing of full blood stock in this county which there should have been. The town of Union, I believe, is an exception. They are there paying considerable attention to the raising of full blood Devon stock, but on account of the storm during the exhibition, there were none present."

Fruit.

Besides the fruit shown by Mr. Currier, alluded to by the Secretary, were fine lots from Thomas Simmons, Aaron Stewart, Thomas Herbert, and others; also finely kept specimens of white grape and Victoria currants, from John Currier, and English gooseberries, by the same. The committee speak highly of samples of red currant wine from Thomas Herbert, of Bristol, and Mrs. Geo. Lindsay; also of wines from the black Naples currant and the raspberry, from Mr. Simmons. A specimen of wine from the Concord grape was shown by Mr. Herbert. The committee encourage the production of pure wines from native fruits, which may supercede the factitious wines of commerce.

Miscellaneous.

Noticeable among these, and adding much to the exhibition, was a collection of natural curiosities by Dr. Rouse; also a reflecting telescope and a gyrascope, made by Dr. E. P. Chase, of Rockland, and which the committee say indicated remarkable mechanical skill.

Crops.

Indian Corn. First premium on one-half acre, for 38 bushels, to David Starrett, of Warren; second to David Huston, for 70 bushels on one acre; third to James S. Ingraham, Rockland, for 25 bushels on one-half acre.

Wheat. First premium to E. S Kaler, of Waldoboro', for crop of 30 bushels to the acre. Land in grass for fifteen or twenty years, broken up in the fall of 1858, and planted to corn and potatoes in 1859, with ten cords manure made of swamp muck, stable manure and rock weed,—a yellowish loam, very rocky. Second to George

W. Emery, So. Thomaston, 20 bushels on one acre; third to Amos B. Harding, Union, 27 bushels on 1¼ acres.

Barley. First premium to Thomas J. Simmons, Waldoboro', for crop of 27½ bushels on five-eighths of an acre. (44 bushels per acre.)

Rye. David Starrett, of Warren, 25¾ bushels on 152 square rods.

G. W. Morse, Union, 23 bushels on one-half acre of burnt land.

Jackson Russell, Waldoboro', 27½ bushels white winter rye on 1½ acres.

Oats. Jackson Russell, 52 bushels per acre; David Starrett, 67 bushels on 150 square rods.

Peas. Sumner Leach, Warren, 5 bushels on one-quarter acre.

Potatoes. First premium to Charles Crockett, of Rockland, for 454 bushels of the Cutting's seedling on one acre, one rood and 30 square rods,—fifteen cords of manure.

Benjamin T. Foster, Thomaston, second premium, for 300 bushels on one acre; also 6 bushels of peas on same acre,—seven cords manure and plaster in the hill.

Gilbert Ulmer, 200 bushels snow ball potatoes on one acre,—pasture land, broken in spring, and four cords manure.

Mangolds. Charles Crockett, one-third acre, dug and measured an average square rod, and found 11½ bushels of 64 lbs.,—clayey loam; under-drained and well manured.

Sumner Leach, 150 bushels on one-eighth acre.

Turnips. John Lindley, 200 bushels of English turnips on more than one-quarter acre.

Parsnips. W. E. Tolman, 50 bushels on 20 square rods,—formerly pasture; under-drained, manured with compost.

Onions. Nathaniel Tobey, Waldoboro', 17 bushels on 3 square rods.

ANDROSCOGGIN COUNTY SOCIETY.

This Society, embracing 561 members, held its Exhibition at Lewiston, 2d to 4th, and 12th and 13th October. The show was a very good one, but owing to rainy weather, the animals and articles shown were fewer than usual. The storm was so severe that a part of the exhibition was postponed a week.

Some of the premiums awarded were as follows:

For best stallion, to Nelson Strout, of Durham, for a Drew horse, 8 years old.
" second best, to L. I. Pollard, of Turner, for a Morgan 5 years old.
" best Breeding mare, to I. S. Loring, of Lewiston.
" second best, to E. F. Pratt, of Greene.
" best Devon bull, to A. Burbank, Lewiston.
" " cow, to S. R. Bearce, Lewiston.
" " heifer, to A. C. Read, Lewiston.
" best Hereford heifer, Joshua Robinson, Lewiston.
" second best Hereford heifer, A. Burbank, Lewiston.
" best and second best Shorthorn cow, to B. B. Rackley, Greene.
" best Shorthorn heifer, to C. H. Nevins, Lewiston.
" second best Shorthorn heifer, to Sewell Moody, Webster.
" best fine wool buck, to D. M. Record, Lewiston.
" " ewes, to same.
" best boar, to Tristram Hill, Greene.
" best Breeding sow, to I. H. Merrill, Auburn.

From Report on Implements.

Beholding the great display of implements now offered to the tiller of the soil, our minds are thrown back to the time when Adam and Eve were placed in the garden and directed to dress and till it. Not one of this vast array of the labor saving implements and tools was

then at command. Two hands were all the implements they had to operate with by which to supply all the demands of nature. How wonderful the change! How has this been brought about? By mind acting upon matter agreeably to the law of demand and supply, and more has been accomplished within the last half century to facilitate the operation and reduce the toils of the agriculturist, than through any period of the same length from the days of Adam and Eve.

One great agency, in the opinion of your committee, in producing such desired improvements has been agricultural associations, from the farmers' club in the secluded neighborhood, to the world's fair. To whatever perfection we may think the numerous implements have now arrived, can we not look forward with hope, that the things now so much admired, in less than half a century to come, will give place to others, as far in advance of them, as those are superior to what were used a quarter of a century ago. Without this hope in the future, enough has been accomplished to establish the practical utility of agricultural associations. If we may judge the future by the past, the time is not far distant, when very much of the power now required to perform our agricultural operations, may be dispensed with, by the introduction of still greater improvements not yet thought of. Clearly, then, a demand is made upon every lover of his country to foster and cherish every association that tends to develope the faculties of mind when applied to mechanical and agricultural improvement. Let it not be said that our implements are now perfect, but exercise our best judgment in suggesting to the mechanic a defect to be remedied or an improvement to be made.

From Report on Composts.

Of all the questions treated upon by this Society, none is of more vital interest to the farmer than this. Manure to the life and growth of vegetables is what food is to animals. The preparing of food for animals involves scientific principles, and requires much research,—but not more than the preparing of food for plants—or the combining such fertilizers as will best promote the growth of farm crops.

To master this science requires more chemical knowledge than your committee would dare claim.

We understand that the Society, by offering a premium on compost manure, wish to arrive at the best method of so combining such materials as are available to all farmers—as to afford the cheapest and most effective fertilizer. To this end it offers its money to encourage the study and application of agricultural chemistry among its members. In some respects, it is encouraging experiments, and yet the constructing of valuable manures need not be simple experiments. An accuracy of knowledge may be arrived at as certain in its results as any geometrical problem or mathematical demonstration.

A man with proper information may go to work to construct his manure heap with the same certainty that he puts rocks together to build his stone wall. Any decaying matter is suitable to be composted for fertilizing the soil, only we need to understand how to combine them so that the gases and volatile salts shall be retained in the solid mass till mixed with the earth and needed for use.

So much interest does not seem to be felt in the subject of manures as would be desirable, only three competitors having presented themselves for premiums. The competitors are Mr. Oliver Mower, Mr. Tristram Hill, and Messrs. Lewis Gilbert and son, all of Greene.

Farmers of Androscoggin, according to this, Greene bids fair to be the richest town in the county.

Mr. Mower's method of preparing compost is as follows:

One cord of rich earth, the wash of the road.

Two cords muck.

Two cords mud and leaves from hard wood forest.

Two cords hog manure procured at a tannery, the hogs being fed on fleshings of hides. Also about half a cord being partly hen manure, lime and ashes.

All can readily see that this must be a very powerful manure and rich in ammonia, as was shown by the specimen presented. But as Mr. Mower relied for its strength chiefly on the hog manure from the tannery, and as he has engaged all that Miller & Randall will have for the year to come, we do not conclude that this information will be very valuable to farmers in general. They could not obtain the material on their farm. Mr. M. understands the value of manure to the farmer and has enterprise to procure it. He pays four dollars per cord for this article at the tannery, and hauls it eight miles, and no doubt makes money by the operation.

We judge from the composition and odor of Mr. M.'s specimen that there were not absorbents enough to retain the volatile gases while the introduction of the alkaline substances, ashes and lime, instead of fixing, aided the escape of the ammonia. Two or three times as much of soil we think would have been a decided saving in this case.

Mr. Hill's statement is as follows:

"I collect leaves, muck, rich soil and decayed vegetable matter, and let my hogs work it over. I then form my heap of equal parts of this and stable manure. I wet it with suds and the drainings of the yard, to prevent too rapid fermentation. I also add plaster to prevent the escape of the gases and to retain the ammonia. When the heap is sufficiently decomposed, open it and add salt in the form of brine, which prevents further fermentation and keeps the compost in the same condition till applied to the land, as food for plants. The effect of such compost on crops, I think fully equal if not better than the best of stable manure."

Messrs. L. Gilbert & Son say—

"The leanto in which our cattle are tied is constructed with a water-tight trench behind the cattle 2½ feet wide and 3 inches deep. The cattle have been stabled nights during the whole season; and into this trench has been thrown a quantity of muck equal to about three-fourths of a bushel to an animal, or enough to soak up all the liquid droppings of the cattle. The droppings, both liquid and solid, fall immediately upon the muck, and after receiving them for one night the whole is removed through scuttles in the trench to the cellar below; this operation completely mixing the whole mass. In the cellar it is allowed to remain in as light a condition as possible, where decomposition immediately commences. In this manner, we have manufactured a large quantity of the richest quality.

We have also six or eight cords composted in the following manner:

The stalls in which our horses were kept were supplied with a liberal share of bedding consisting of brakes (ferns.) The manure and saturated bedding were passed through a scuttle into the cellar beneath. Every few days this heap was forked over and a quantity of muck equal to the manure carefully and equally mixed with it—the muck preventing that excessive fermentation which would otherwise immediately take place. In the month of June this heap was again forked over and left as light as possible, so the air would permeate the whole heap, and thereby hasten decomposition. The muck used was thrown from the pit into heaps in the summer of 1859, and hauled the next winter while frozen. When thawed, it becomes thoroughly pulverized. From experiments conducted through a series of years, on almost all kinds of crops, it has been found that this compost is of the richest quality, and produces the most satisfactory results."

CROPS.

Indian Corn. First premium to Nelson Haskell, of West Poland, for 88 bushels shelled corn on one acre.

Second premium to John Lombard, of Wales, for 376 bushels of ears on three acres,—land in grass for ten years, and bearing one-half ton to the acre; twelve loads compost per acre ploughed in, and as much more in the hill; also a little compost made by putting 20 bushels muck and a cask of plaster in the poultry house where 30 hens were kept in the fall, and shoveling it over with the droppings in spring. Thinks much of the crop was due the poultry compost.

Third to Milton Carvill, for 122 bushels of ears on one acre.

Wheat. First premium to Joel Moulton, for crop of 30 bushels per acre,—land in corn last year.

Second, to John Lombard, for crop of 28 bushels per acre.

Third, to H. C. Briggs, of Amherst, for crop of 26¼ bushels per acre.

Barley. First premium to Lewis Gilbert & Son, for crop of 43 bushels per acre.

Rye. First premium to S. C. Stetson, of Auburn, for 28 bushels per acre.

Second, to J. B. Garcelon, for 25 bushels.

Oats. First premium to S. H. Haskell, of Danville, for crop of 87 bushels per acre.

Second do., to Jacob Parker, of Greene, for crop of 61½ bushels per acre.

Potatoes. First premium to Samuel Chadbourne, of Greene, for 280 bushels on one acre.

Second, to Jacob F. Drinkwater, of Webster, for 247 bushels on one acre.

Ruta Bagas. Samuel Chadbourne, for 330 bushels one half an acre.

J. F. Drinkwater, 175 bushels on 45 square rods.

J. S. Drake, a lad of 13 years, showed eighty-one varieties of vegetables and fruits of his own production, receiving a premium for variety of farm products.

SAGADAHOC COUNTY SOCIETY.

The Secretary, Isaac P. Tebbetts, writes me that this Society, embracing 410 members, held its Annual Exhibition at Topsham, on the 9th, 10th and 11th of October, and was very successful, being equal, if not superior, to any previously held, in the number and excellence of the animals and articles shown.

Among the premiums awarded were the following:

First on stallions, to Harvey McManus, of Brunswick.

To Arthur Adams, for best Breeding mare.

To Jacob McDonald, Bath, second best do.

To Thomas S. Minot, Brunswick, for best Devon bull, bred by I. Jordan.

To L. W. Tedford, Topsham, for best Devon cow, bred by Isaiah Wentworth.

To Isaac Mallett, Topsham, for best Devon heifer, bred by himself.

To L. W. Tedford, second best Devon heifer, bred by himself.

To S. F. Dike, Bath, for best Ayrshire cow, bred by R. Jardine, New Brunswick—a very superior milker.

To Nathaniel Snow, Brunswick, for Jersey bull, sired by Czar out of Daisy, from Roxbury, Mass.

To S. F. Dike, for best Jersey heifer, 3 years old, bred by Messrs. Grant & Bacon.

Mr. Dike, in his statement, says that "this breed is suitable for families who desire a moderate amount of very rich milk. They are not so cheaply kept as some other breeds, as they require more rich food; yet they endure our climate and common fare quite well."

Sheep. First premium on long wool buck, to Isaac Wilson, of Bowdoinham.

Second, to David Work, Jr., of Topsham, and first to same, for long wooled ewes, cross of Cotswold and Leicester.

Second, to Isaac Wilson, of Bowdoinham.

Thomas S. Minot, for South Down buck, bred by Wentworth.

Swine. For best boar, to Isaac Wilson, Chester breed.

Second, to James Alexander, Brunswick.

C. J. Gilman, Brunswick, showed a fine Suffolk boar, not old enough to receive premium.

To Wm. B. Trufant, West Bath, for best Breeding sow, a Berkshire, 30 months old, and has had four litters of eleven each, the first three of which were sold for $99, and the last estimated at $25 at ten days old, when shown.

To J. D. Fisher, Bowdoinham, for second best, a cross of Chester and Newbury white.

The committee on Poultry think sufficient attention is not given to the subject. They say, "few have any idea of the income derived in this way. We now export from this State (besides all consumed in it,) 4,337,777 dozens of eggs, worth $607,288—667 tons of poultry, worth $135,400. Total value, $742,688, or about three-quarters of a million of dollars.

From this county alone, the eggs exported are 109,600 dozens, worth $15,344; 19 tons of poultry, worth $3,800—in all, $19,144. It is a business highly worthy of attention."

Fruit.

Among the fruit shown, were Bartlett and Flemish beauty pears, a bushel each, by Geo. E. Springer, Brunswick, and thirty-five varieties of apples, by Abraham Preble, of Bowdoinham.

Specimens of the Fulton pear, which originated in Topsham, in this county, were also shown, and several varieties of grapes,—one fine sort, said to be native, and closely resembling the Rebecca or Chasselas.

Agricultural Implements.

The committee especially commend the "Coulter harrow," made by Staples & Sprague, of Topsham; also the "Green Mountain feed cutter," made by Perry, of Gardiner.

Premium Farms.

Three premiums were awarded. It is a noticeable fact that in all these, much attention seems to be given to composting and to the use of marine manures. First premium to Geo. W. Jellison, of Bowdoinham. Bought his farm of 120 acres twelve years ago, for $1,500. It then cut 15 tons upland hay. In 1859, cut 60 tons on forty acres. In 1860, 40 tons upland, and 15 of fresh hay. Value of crop this year, $1,500. The past year, reclaimed six acres of rough pasture; half of it an alder swamp. He also received first premium on composts, of which one lot was made of 60 loads swamp muck, 10 loads thatch hay, 10 cords rock-weed, to which were added 30 large sturgeons and 5 hogsheads of fish brine, and the droppings of 20 head of cattle. Another parcel was 7 cords of muck, 10 of rockweed, and 5 from the pig sty; "both made first rate manure."

The second premium on farms, was awarded to Isaac P. Tebbetts, 75 acres, of which 45 was in pasture and wood. He made "43 cords of valuable compost, consisting of barn-yard manure, muck, hog manure and rock-weed," for which he obtained also the second premium on compost.

Wm. Alexander, of Harpswell, third premium on farm. The committee say, "he makes free use of sea-weed and other substances, for compost manure."

Thomas Pennell, third premium on compost made of "muck, sea-weed and other weeds, potato tops, liquids from the wash room, &c., &c., worked over by store hogs." Estimated cost, "a dollar per cord, and more valuable than stable manure."

Under Drains.

First premium on under draining, to Wm. White, of Bowdoinham. Mr. White says,—

"My drains were dug, on an average, three and a half feet deep. The width of main drains about two feet, the branches eighteen inches. Bottom of drains laid with a stone culvert and filled up with small stones, within *two and a half* feet of the surface; then covered with hemlock and spruce brush, weeds or straw, well trodden down, then filled up with the earth taken out of said drains. Whole number of rods completed the last year, 207; at an average cost of fifty cents per rod."

Second, to A. S. Perkins, Topsham, 130 rods, at cost of 62 cents per rod.

Crops.

Indian Corn. First premium to Wm. Alexander, Harpswell, for 315 bushels of ears on two acres 70 rods,—dressed with stable manure and sea dressing.

To James F. Mustard, for 147 bushels ears per acre,—16 cords barn manure applied.

To Pennell Alexander, partly harvested; thinks there was 165 bushels per acre.

Wheat. Joshua Haskell, 13 bushels on half acre.

Wm. B. Trufant, second premium, 14 bushels; amount of land not stated.

Isaac P. Tebbetts, 26 bushels on one acre.

Alfred Gowell, of Bowdoin, 25¾ bushels on one acre.

Wm. Alexander, 44½ bushels on two acres and 10 rods.

Barley. Pennell Alexander, 55 bushels on one and a half acres.

J. M. Sanford, 18¾ bushels on one-half acre.

Alfred Gowell, 46 bushels on one acre and 63 rods.

Rye. Wm. Alexander, 19 bushels on 116 rods.

Oats. Richard Adams, 160 bushels on 2¾ acres.

Potatoes. Geo. W. Jellison, Bowdoinham, 300 bushels on one acre, several kinds.

Isaac Mallett, Topsham, 175 bushels on one-half acre, long reds.

Carrots. J. M. Sandford, Bowdoinham, 101 bushels on one-eighth of an acre.

Mangolds. Thos. Pennell, Harpswell, 155 bushels on one-eighth of an acre.

Lewis Sampson, Brunswick, 1000 bushels on one acre.

Beets. Thomas Pennell, for 112 bushels of sugar beets on one-eighth acre.

The Secretary remarks as follows:

"The exhibition of corn and grain was all of superior quality, and quite numerous, many not competing for premiums. One sample of white winter wheat was exhibited by the undersigned, the only sample of the kind. It was very plump and white; weighed about 68 pounds to the bushel. Raised 26 bushels on one acre of land, from two bushels sowing. Land in corn *same season of sowing the*

wheat; no additional dressing; sowed 20th September. Received notice by the committee of *gratuity*,—no premium was offered for *winter wheat*. It makes as good flour as any other grown north, south, east or west.

The show of vegetables was really surprising, after so dry a season, fully grown and in great variety. There were several samples of turnips, but none for premium on crops,—only for best samples, or baskets.

ISAAC P. TEBBETTS, *Secretary*."

KENNEBEC COUNTY SOCIETY.

The Annual Exhibition of this Society was held at Readfield, Oct. 9th, 10th and 11th. The show of dairy products, fruit, vegetables and grains, was excellent. The horses and oxen shown were good, other classes of stock inferior to former years, the number of full blood animals being quite limited for this section.

Among the premiums awarded are the following:

To Elijah Farnham, of Winthrop, for best stallion, 4 years old, (Eaton.)

To Benjamin Philbrick, Mt. Vernon, for second best, (Eaton.)

To Josiah Brown, of Vienna, for best Breeding mare.

To John Wing, of Manchester, for second best.

To Joseph H. Underwood, for best Hereford heifer, bred by himself.

To Carpenter Winslow, of Manchester, for best fine wool buck, bred by himself.

To S. G. Fogg, Readfield, for second best do.

To John P. Craig, Readfield, for best long wool buck, (Cotswold,) bred by Judge Baldwin, Vermont.

To Silas Martin, for second best do.

To Geo. Glidden, for best long wool ewes. Mr. Glidden also showed grade South Downs.

To Daniel Craig, Readfield, for best boar.

To G. A. Coolidge, Readfield, for best Breeding sow, bred by himself.

To Daniel Craig, for second best do.

Dairy Products.

Mrs. S. G. Fogg, Readfield, who obtained a premium on butter, says:

"My mode of manufacture is as follows: I let the milk stand for the cream to rise until it begins to curdle on the bottom of the

pan, when it should be immediately removed. I have my cream churned twice per week, always before it becomes sour, for I don't know the art of making *sweet* butter from *sour* cream. Every day when I skim the milk, I sprinkle a little fine salt in the cream and stir it briskly for a minute or two; this helps to keep it sweet, and I think the butter comes quicker when the cream is thus treated.

I never wash my butter, but work out every particle of buttermilk with wooden slices made for the purpose. I use nothing for preserving or flavoring my butter, except nice *fine* butter salt."

KENNEBEC UNION SOCIETY.

This Society held its first Exhibition at Gardiner, 16th, 17th and 18th of October. In many departments, it was fully satisfactory; in others, some disappointment was felt. There was a good display of stock, vegetables, fruits and grains. Among the premiums awarded was the first on stallions, to John Shaw, of Augusta, Mack and Messenger.

Second best to Wm. Rollins, of Pittston.

First for Breeding mare, a Morgan, to Edward Wakefield, West Gardiner.

Second to B. S. Bliss, of Gardiner.

For best Devon bull, to Samuel Currier, of Hallowell, bred by Isaiah Wentworth.

For second best to Lot Goddard, of West Gardiner, bred by same.

For best Ayrshire bull, to N. Foster, of Gardiner, bred by R. Gray, New Brunswick. Mr. Foster, in his statement, says the Ayrshires make powerful, active and intelligent working oxen, and as a dairy breed, have no equals.

For best Jersey bull, to S. B. McCausland, of Farmingdale, bred by Mr. Chisham. He also showed another bred by Wm. S. Grant, and one bred by Geo. Bacon, Boston.

For best fine wool buck, to Daniel Lancaster, Farmingdale. Also to the same, for Spanish Merino ewes.

To S. B. McCausland, for best South Down buck, bred by S. Thorne, New York.

To the same, for Cotswolds, bred by Wm. S. Grant, Farmingdale.

The committee on bulls say that

"The Ayrshires brought to the show by N. Foster, the President of the Society, and the Devons of S. Currier and Lot Goddard, were very superior animals, and those gentlemen are entitled to much praise for the interest they thus manifest in the improvement of stock within the limits of this Society.

Mr. McCausland's Jerseys showed many of the peculiarities of that race or breed of cattle, and if very rich milk and cream is all that is required, they will answer a very good purpose.

Of the grades that received premiums, the Durham and Devon blood seemed to predominate. No grade Ayrshires were exhibited, although it is understood there are many good ones within our limits."

The committee on incidentals speak of "a yoke of cows entered by Mr. H. L. Cushing, of Augusta. These cows, or rather heifers, for they were only two years old last spring, were said to be of the Farwell or African breed. In size they were small, but they had the appearance of being compactly built and of being vigorous and hardy. Mr. C. said they were accustomed to work in the yoke and that they were as handy as steers. He claims that there is great advantage in thus training cows to the yoke for farm work, as thereby the expense of keeping oxen for such purpose is saved. The quantity of milk from working cows he contends does not fall much below that from other cows, the feed in both cases being the same. The quality of the milk is not affected. The subject is commended to the consideration of the farmers by the committee, who have no opinion of their own to express."

NORTH KENNEBEC SOCIETY.

The Secretary reports as follows:

"This Society now embraces 250 members. Its Annual Exhibition was held at Waterville, on the 2d and 3d days of October. The day preceding the show was rainy and unpromising, and kept many people from attending the Exhibition, and made the show smaller in regard to numbers than usual. There was a fine show of working oxen, grade Durhams entirely; a fair show of what we call stock cows, but a few young animals of any kind. The show of sheep surpassed that of any former exhibition, both as to numbers and quality; the various breeds were fully represented, and there seems to be an increasing interest in this department. Swine were shown in goodly numbers. The Chesters are now the favorite breed. Rev. Mr. Dillingham, of Sidney, had fine specimens. As I have stated in former returns, the horse interest largely predominates, and the introduction of the fine stallions by T. S. Lang, Esq., into the limits of our Society, has had the effect to foster that interest. There was a fine exhibition of horses, and the amounts awarded to them, as you will perceive, largely exceeds that of any other class of animals.

Our farmers are very backward about filling the blanks which are furnished them, and when they do, they convey but little information worth publishing.

The season in this vicinity has, on the whole, been a favorable one for the agriculturist. We have had, with the exception of the hay crop, more than an average yield of all farm crops. Hay, about two-thirds of usual yield, but the quality of what we have is remarkably good, and it was saved in the best possible manner. Corn, the yield has been smaller than usual. The deficiency in this and the hay crop, is attributable to the severe drought which continued almost entirely through the season. The grain crop, of every description, was better than for many years; particularly so with wheat. I have not learned of a single failure, when it was sown. Potatoes have

done finely, and no cases of the *rot* amongst us. Fruit never better, although there is at this time great complaint of its early and unusual decay. In consequence of scarcity and high price of hay, and the low price of neat stock, our farmers are turning their attention to, and studying, the best methods of winter feeding their animals. If it results in their learning the fact that by treating their animals more humanely by keeping them housed, warm and quiet, a large per cent. in the cost of their keeping may be saved; and thereby, too, their growth may be kept up through the winter as well as summer. Then will the community have made a gain instead of loss by the failure of the hay crop.

Respectfully yours,

JOS. PERCIVAL, *Secretary.*"

Among the premiums awarded, were the first on breeding mare, to Luke Brown, Waterville.

Second to George E. Shores, Waterville.

For best Short horn bull, 'Duke of Manlius,' 3 years old, bred by Geo. Butts, New York; premium to Warren Percival, of Vassalboro'.

Second premium on the same, to the same, for one bred by Jesse Wadsworth, 4 years old.

To the same, first and second premium, on two Short horn cows, bred by W. S. Grant, Farmingdale.

First and second premiums on Short horn heifers, to the same.

To Hall C. Burleigh, Waterville, for best fine wool buck.

To Geo. E. Shores, for fine wool ewes.

To Joseph Percival, Waterville, for best long wool buck, bred by T. L. Hart, Conn.

To the same, for long wool ewes.

Mr. Percival, in his statement, says:

"The buck is four years old, weighs 225 lbs; was bred by T. L. Hart, of Connecticut: has been sold for $60: is now worth say $15: his fleece weighed 8 lbs.; he is a pure bred Cotswold; a sure stock getter; his lambs now from five to six months old, weigh from 100 to 125 lbs, and are very promising—are worth from $5 to $10. The flock of ewes are Leicesters, bred by myself from stock imported from Canada West; they weigh from 100 to 150 lbs.; have the most of them raised lambs the past season; their fleeces average 4 lbs. clean, well washed wool. The Leicesters and Cotswolds are

peculiarly mutton sheep, are good breeders, generally have twins, good nurses, come early to maturity; the lambs will bring from 50 to 100 cents more than the common breed. They are quiet and docile, take on fat readily; frequently weigh from 200 to 250 lbs. at 3 years old."

Second premium on long wool ewes, to H. C. Burleigh.

First premium on boar to W. A. P. Dillingham, of Sidney, for one of Chester County breed.

Second premium to George Livermore, China.

First premium on breeding sow, to Joseph Percival.

Second premium to W. A. P. Dillingham, Sidney.

Crops.

Indian Corn. First premium to Benjamin Hanson, Waterville, for 94 bushels on one acre and a quarter, or 75 bushels per acre—clayey loam, underdrained last year—so wet formerly that no crop was taken from it—five cords of stable manure, one-half in the hill and half applied broadcast; only four bushels of ears but what was merchantable.

Barley. First premium to E. G. Sawtelle, of Sidney, 58 bushon one acre—land in corn last year.

Isaac H. Hansom, Waterville, 53¼ bushels on one acre.

Oats. E. G. Sawtelle, 64½ bushels on one acre.

Peas. Joseph Percival, 14 bushels on one-half acre; also, for 36 bushels grown on 4 acres planted with potatoes.

FRANKLIN COUNTY SOCIETY.

This Society, numbering 400 members, held its Annual Show at Farmington, Oct. 3d, 4th and 5th. No report of the Exhibition has been received.

Some of the premiums awarded were as follows:

For best Devon bull, to Leonard T. Vosmus, of New Sharon, for 'Androscoggin,' bred by A. C. Mitchell, Auburn, calved May 1857, by Caledonia, (379 Devon Herd Book, Vol. 3,) out of 'Beauty,' Beauty by 'Winchester' out of Beauty, bred by Messrs. Hurlburt, of Winchester, Conn.,—valued at $300.

For second best, to Stephen P. Littlefield, of Wilton.

To the same, for best Devon cow, bred by Frederick Smith, Vt.

For best short horn bull, to Thomas Allen, of Wilton, for 'Athol Duke,' bred by D. B. Hight, Duchess Co., New York, 1857.

For second best, to Almon Brown, for one sired by 'Bay State,' out of 'Lady Bay State,' bred by Wardsworth.

For best bull calf, to Thomas Allen.

For second do., do., to Philip Norcross.

For best Short horn cow, to Alexander Hillman, of Farmington.

For second best, to Thomas Allen.

For best Short horn heifer, to Alexander Hillman of Farmington.

For second best, to Almon Brown, of Wilton.

For best fine wool buck, to Elijah Norton, of Farmington,—bred in Enfield, N. H.: fleece weighed 11 lbs. washed wool.

For second best, to the same.

For best South Down buck, to C. K. Adams, of Wilton—bred from stock imported by Daniel Webster.

Middle wool sheep—breed not stated—shown by Henry Clark and H. Adams, of Wilton. Also Cotswolds, and others, by L. H. Greenwood, James Allen, and others.

For best boar, (Chester) to David Ingham, Farmington.

For best breeding sow, to Z. H. Greenwood, of Farmington—bred by Thos. Wood, Penningtonville, Pa.

Crops.

For best wheat, to James Tuck, of Farmington, for 58 bushels on one acre and 60 rods, or 42 bushels per acre. Land in corn last year.

Second to E. R. French, Chesterville, for 33 bushels on one acre. His statement is as follows:

"My crop, consisting of 55 bushels, 61 lbs. to the bushel, was grown on 1¾ acres—one acre yielding 33 bushels, and the three-fourths acre 22 bushels.

The soil on which it grew was a sandy and stony loam, the three-fourths acre being in places quite ledgy. On this piece of ground, I tried the following experiment: One half of the piece was prepared in the fall, and the other half in the spring, and all sowed the same day, May 1st; and the result was, that the fall plowed was three days earlier in coming up and at harvest time,—it stood the drought better, was stouter grown and of a darker green, and yielded at the rate of five bushels to the acre more than the spring ploughed, all other things being equal.

My method of culture is this: I break up the sward in the fall or spring, nine or ten inches deep, spread on green manure at the rate of 2 or 3 cords to the acre, and thoroughly work it in with the cultivator and harrow; then plant with corn, putting 'old manure' in the hill at the rate of from 4 to 5 cords to the acre. To prepare for wheat, I first split the hills with a double mouldboard plough, then spread on green manure again at the rate of 3 cords to the acre, harrow thoroughly across the rows, and plough from 5 to 6 inches deep; then harrow once for sowing and twice afterwards, sowing on the grass seed before harrowing the last time; then roll evenly, to make a smooth surface. The seven-eighths of an acre fall ploughed, with one-eighth acre of the spring ploughed, yielded 33 bushels.

After carefully estimating the cost, and deducting it from the value of the crop, together with the manure left in the ground for future grass crops, the net value amounts to $30 to the acre, or equal to $1 a bushel for a crop of 30 bushels to the acre.

Chesterville, Franklin Co. E. R. French.

Nathan Goodridge, Industry, 32 bushels per acre, Java wheat.

Barley. First premium to Edward Staples, of Farmington, for 52 bushels on an acre,—in corn last year, with 15 loads (of 35 bushels each) manure; was planted to potatoes a year earlier, without manure, being a worn out piece of greensward.

C. K. Adams, 33½ bushels per acre.

Potatoes. David Miller, of Wilton, for 251 bushels on one acre (Jacksons and State of Maine.)

Ruta Bagas. John W. Dyer, of New Sharon, 230 bushels on quarter acre, and 175 bushels on another quarter acre,—good crops for so very dry a season. His statement on the first lot is as follows:

"My crop, consisting of 230 bushels of 60 lbs. to the bushel, was grown on one-fourth an acre, being at the rate of 920 bushels to the acre. The soil upon which it grew was a moist, stony, rather coarse and gravelly soil, inclining to red or brown, and rather stiff. It is about 15 inches to a hard sub-soil; was seeded to grass in 1854, and the amount cut per acre was never more than three-fourths of a ton. It was in the poorest condition for a crop of any land on my farm that had been cultivated with hoed crops. It was ploughed 1¼ acres in the month of October, 1859, about 9 inches deep, and on the last of April, 1860, there was carted on to the 1¼ acres about eight cords strawy manure from the sheepfold, and cultivated in with the ox cultivator. One acre was planted to corn, and one-fourth an acre to turnips.

Before planting the turnips, we carted on one cord more from the sheepfold, making in all about three cords upon the quarter of an acre. It was then cultivated with the ox cultivator, harrowed, furrowed 2½ feet apart, manured in the hill with fine barnyard manure into which had been incorporated about 10 bushels of turkey manure, 3 bushels of ashes, 2 of mild lime, and 1 of salt, about 1¾ cords in all. The hills three feet apart, with two or three turnips in each hill. Planted 10th of June. Hoed once before haying, and the weeds cut up after haying. Harvested October 27th."

The Secretary writes that crops of all kinds, except hay, have been unusually good, but that farmers have been very negligent in reporting their crops and applying for premiums.

NORTH FRANKLIN SOCIETY.

The following abstract (somewhat abridged,) of the transactions of this Society, was furnished by the Secretary, J M. Kempton, Esq.:

"The Show and Fair of this Society was held at Phillips, on the 5th and 6th of October. Notwithstanding the first day was rainy, yet the amount of stock upon the ground exceeded that of any former year. There were thirty horses entered for premiums.

The first premium on stallions was awarded to Joseph N. Fairbanks, of Phillips, on an Eaton horse, six years old.

The second premium was awarded to Elbridge Dill, of Phillips, on a horse of mixed blood—French, Messenger and Native, five years old.

The first premium on breeding mares, was awarded to Amos P. Wormell, of Phillips.

The second premium to Andrew J. Parker, of Phillips, on an Eaton mare.

Bulls and Bull Calves.

To George Goodwin, of Avon, for best bull, 3 years old, a grade Durham.

To Charles V. Quimby, of Phillips, second best, a cross of Durham and Hereford.

D. M. Spaulding, New Vineyard, for best 3 years old bull, 15-16 Durham.

J M. Wills, of Phillips, for second best, a cross of Durham and Devon.

Simeon W. Weymouth, of Freeman, for best 1 year old bull, grade Durham.

Shelden H. Beal, of Avon, for second best, a full blood Short horn, bred by Samuel Daggett, of Industry.

Milch Cows.

First premium to Seward Dill, of Phillips.

Mr. Dill says, in his statement—

"She is eight years old; breed not known, but suppose her to be small part Jersey.

I purchased her in the summer of 1858, farrow. She gave through the fall about twelve quarts of good rich milk per day. Through the winter, about ten quarts. Summer of '59, twelve quarts. Went dry in January 1860. Calved April 27th. Gave through the hight of feed, from twenty to twenty-four quarts per day. Gives now, about sixteen quarts.

I always feed well in winter, using good hay three times a day, and potatoes, beets, carrots, parsnips or cabbage, once a day. The last two I consider the best for quality and quantity of milk. Feed six to eight quarts per day. Good water given three times a day.

In the summer, she gets the fragments from the kitchen, with a little meal or bran; and, beside, I commence about the first of June to cut small plats of grass about the house and garden, and feed green or wilted, as I have time to attend to it. When the grass is gone, give corn suckers and stalks from the garden."

First premium on stock cow, to Wm. True, of Avon, for Short horn cow Lacy. Her pedigree is given as follows:

"Lacy was calved May 1853, bred by H. W. Wormwood, Esq., formerly of Strong, Me. Got by North American (116.) Dam, Lady Darlington 3d, by Leopard 2d, (90.) Grand-dam, Lady Darlington 1st, by Darlington. Great-grand-dam, Eastern Cherry, by Pilgrim. Great-great-grand-dam, Flora, (called by some 'old Flora,') imported by Mr. Cornelius Coolidge, of Boston, in July 1818, 'bred by Mr. Mason, of Chilton, Durham, whose herd was justly celebrated for its high breeding and purity.' Flora was 'got by Lafon bull which was got by Comet, (155.) Flora's dam was also got by Comet, and gave thirty-three quarts of milk per day."

The committee in their report judiciously remark that

"In breeding stock, one cannot well be too particular in the selection of the animals to be bred from, if we wish to make improvement with the least expense. If one wishes to breed for dairy purposes, it is not best to set too high a value upon chance dairy qualities in a cow: because seldom any of her progeny, with all the pains we may take, will be equal to the dam. We must look farther back than this, to produce milch cows with any certainty of their being good milkers. There should be a fixed, characteristic milking tendency on both sides; and though this brings us upon the much vexed question of whether the sire or dam influences the milking traits most, yet it will be safe to require of the bull, as well as of the cow, a good milking lineage."

Sheep.

The farmers of North Franklin are beginning to wake up to their true interests, in this branch of farm stock. No other pays the farmer so well. Several Cotswolds, and South Downs, have been introduced, and some of the Leicester.

J. B. Knowlton, of Strong, for best coarse wool buck, Cotswold, imported from Connecticut.

T. K. Allen, of Rangley, second best, Cotswold.

Joseph Haley, of Avon, third best, Cotswold crossed by the Leicester.

On fine wool buck, first premium was awarded to E. B. Hunt, of Avon.

Second, to N. B. Beal, of Phillips.

For best six fine wool sheep, first premium to William Ross, of Phillips.

On coarse wool sheep, first premium to J. B. Knowlton, of Strong, Cotswolds.

Second best, to Hiram K. Wheeler, of Phillips, Leicester cross.

Third best, to Joseph Haley, of Avon, Leicester and Cotswolds.

To J. B. Knowlton, of Strong, first premium on six coarse wool lambs, Cotswolds.

Second best, to S. H. Beal, of Avon.

Third best, to H. K. Wheeler, of Phillips, Leicester cross.

Swine.

All exhibited were white Chester. This breed is esteemed so highly, in this vicinity, that those having other breeds, do not attempt to compete. They were brought from Pennsylvania, into this part of the county, by J. B. Knowlton, of Strong. Premiums were awarded to J. B. Knowlton, of Strong, John J. Goodwin, of Phillips, and Joseph Haley, of Avon.

Crops.

We have never known so great interest manifested in, and so much competition on, crops, since the Society was chartered; and from the statements received of the large products, it would seem that a

Divine Providence has been pleased to smile more bountifully than ever before in rewarding the husbandman for his toil. The very marked interest upon this subject is worthy of more than a passing notice. The Society's influence seems to have been decidedly good, in its efforts to awaken a deeper interest upon this subject.

In years past, there appears to have been a falling off in the amount of crops generally, in this vicinity, without any good reason. But by bringing the farmers together, year after year, and comparing their results, and holding out liberal inducements to compete with each other in the thorough preparation of the soil, and the cultivation of different crops, they have been enabled, by the comparison of their experience, to obtain as large returns as from the virgin soil.

Wheat. Premiums awarded to Lewis D. French, of Avon, Enoch Craig, of Freeman, and Samuel Jacobs, of Avon, on 31½, 29½ and 27 bushels per acre.

Gilbert Voter, 2d, of Madrid, on burnt land wheat, 30 bushels. It is a fact, perhaps worthy of note, that on the two pieces that produced the largest crops, only one and a half bushels of seed were sown to the acre, while on the others, two bushels.

On half acre, to Samuel Jacobs, of Avon, and T. F. Perkins, Avon, 14½ and 13½ bushels.

Rye. T. F. Perkins, 39 bushels per acre.

Barley. J. P. Cook, of Avon, and Benj. Soule, of Phillips, on half acre, 25 and 24 bushels.

Oats. Clark Mitchell, and Isaac Howland, Avon, 68 and 67 bushels per acre.

Peas and Oats. E. B. Hunt, Avon, 57 bushels per acre, 40 pounds per bushel.

Corn. J. N. Houghton, Phillips, L. D. French, Avon, C. T. Burnham, Strong, and Benj. Soule, Phillips, 201, 138, 132½ and 131 bushels of ears per acre.

On half acre, J. T. Cook, 79 bushels ears, L. D. French, 73, and Stephen Manchester, 68, Avon; and Elbridge Dill, 25 bushels shelled corn, Phillips.

Potatoes. Enoch Craig, Freeman, best acre, 337 bushels.

H. M. Butterfield, Phillips, second best, 262 bushels.

John Cunningham, Salem, best one-half acre, 210 bushels, California variety.

John Abbott, Rangley, second best, 150 bushels.

Peas. T. F. Perkins, best one-half acre, Clark Mitchell, second best.

Beans. John Church, Phillips, best acre, Stephen Manchester, Avon, second best.

Herdsgrass (Phleum pratense) Seed. Thomas Vining, Avon, best acre, 7 bushels.

The most value on one-eighth acre. The committee report premiums to S. A. Blanchard, of Phillips, H. M. Butterfield, Phillips, and Joseph Haley, of Avon. Value estimated according to statement, $37.42, $38.17, $35.67.

On one-eighth acre Turnips, to J. T. Cook, Avon, 152 bushels; Benj. Soule, Phillips, 141 bushels, and Moses Bray, Phillips, 125 bushels, being at the rate of 1216, 1128 and 1000 bushels per acre. Mr. Cook, in his statement, recommends changing the turnip seed every year.

Same committee also award a premium to William Ross, of Phillips, on three-fourths acre barley, on which he raised 47½ bushels, being at the rate of 63⅓ bushels per acre. Corn on ground last year.

Compost Manures.

Very little interest has been manifested on this subject in years past, only one statement having been handed in previous to this year, to our recollection.

Premiums awarded to O. W. True, of Avon, John Dyar, Freeman, and J. M. Kempton, of Phillips.

The Address, delivered by H. O. Butterfield, Esq., of Phillips, was a very able production, deep and comprehensive in thought, and dignified and chaste in style. It was not a mere fancy sketch of the beauties of the farmer's life, but a thorough examination of the agricultural and industrial interests of the country. The leading

idea of the discourse was the *necessity* for additional means for obtaining agricultural education. The argument in favor of introducing agricultural text books into our public schools, and of establishing agricultural schools and colleges, was based upon the principle that taxation and representation should go together; and was well supported by historical and statistical facts, showing that agriculture employs a majority of the people, and pays more than half the taxes of the country. Consequently it should receive as liberal encouragement from the public as any other calling. The policy marked out by this address, if pursued by the farmers of our country, would soon place them on intellectual and social equality with those in other vocations in life.

JAMES M. KEMPTON, *Secretary.*"

WEST OXFORD SOCIETY.

The Exhibition of this Society was held at its grounds in Fryeburg, October 9th, 10th and 11th. The Show is understood to have been a successful one.

From Reports of Committees.

Horses. The visible improvement in horses from the Society's first start, no one can see and not feel the benefit and good of agricultural societies.

To Joseph Holt, of Denmark, we award the first premium for best stallion.

To S. L. Bradbury, of Lovell, second premium.

To John L. Kimball, of Hiram, we award the first premium for best breeding mare.

To Thomas Farrington, of Stow, for second best do.

Cows. To William J. Bradley, premium for best milch cow,—no statement received.

Sheep and Swine. First premium for long wool flock to Charles W. Waterhouse.

Second premium to Henry Walker.

First premium for long wool buck, to C. W. Waterhouse.

Second do. to Perley Rankins, of Hiram.

First premium on short wool sheep, to Col. J. Walker.

" " " buck, " " "

" " for best litter of pigs, to Henry Walker.

" " for best sow, to Col. J. Walker.

Statement of James Walker.

The animals which I offer are six years old, grade French Merino. These sheep, 78 in number, were kept the past winter on meadow hay and corn fodder, and nothing else. No roots or grain of any kind. Corn fodder was given them, equal to one day in a week, for a change of food. In summer they are pastured on the meadow and

in the woods, or in other words, go where they please, except in my fields. I consider this the best breed of sheep for me. They afford a good grade of wool, are hardy, winter well on cheap food, are not inclined to be mischievous in summer. Are not predisposed to disease. Carry their wool well till late shearing time.

As to keeping sheep, give them feed and air enough, and there will be no trouble. It is not necessary to change flocks in order to keep sheep, change your buck every year if you have early lambs, or in two years if you have late lambs. My flock has not been thoroughly changed for over sixty years. They are better now than I ever knew them to be in any former year.

Corn fodder is worth more for sheep than for any other stock.

Farm Improvements. Samuel Stickney, of Brownfield, and Thomas Mabry and Son, of Hiram, were the only competitors for the Society's premiums on farm improvements. Mr. Stickney's chief labor has been to prepare drains and ditches by which to remove the water from a portion of his farm, heretofore almost worthless. It was well worth the pains taken to witness the success of his operations. He raised potatoes this year on land upon which oxen could not walk, and they produced abundantly. His experiments are, however, only the commencement of what ought and no doubt will be consummated. We say to friend Stickney, go ahead, and a *little deeper*, and you cannot fail to receive your reward.

T. Mabry and Son, laid siege to the more solid portion of the earth, and dug out and piled up large boulders, thereby constructing an impassible barrier to the cornfield against the cattle, and also permitting a more thorough pulverization of the soil. Much was done, and much remains to be done. Those old settlers bore the marks of repeated assaults of the plow and harrow, and nobly did they endure this, and reluctantly did they relinquish their possession long held undisturbed, and assume a conspicuous position among their fellows. Strong hands and determined will, will remove every obstruction, so the rocks were compelled to succumb.

Much good will result to this community by well-conducted experiments and a well-regulated system of farm improvements. The increase of the hay crop has never received sufficient encouragement, and cannot, except in a general manner. He who increases the grass-growing qualities of his farm, and causes two spires to grow where one grew before, and demonstrates his *modus operandi*, meets a reward.

Premiums in this class should be awarded rather for the intelligence and economy displayed in farm operations than for the amount of work done. The man of wealth can execute, but the poor man may contrive. The man of wealth can perform a large amount of labor, and bear away the prize, while the man of penury, or one of ordinary ability, performs but little, yet he demonstrates his operations by philosophical principles, and develops with exceeding acuteness and precision all the various natural phenomena involved in an intelligent and successful cultivation of the soil. In a word, he should receive the premium who adds most to the wealth and intelligence of this agricultural community. We should have more competition, and a greater diversity of operations, and we hope next year that much will be accomplished in this department.

It seems to your committee that one year is too short a time in which to decide upon the permanent advantage of this or that operation. A man may commence a piece of work, execute it with zeal, but fail of receiving advantages commensurate with the expense. There was a want of thoroughness or a systematic application of natural principles. His drains may be long and well laid, but not deep enough; or they may run in the wrong direction, or want sufficient outlet. He removed rocks from his fields, to be sure, but their fertility was not increased. The work was done, but his farm was none the better. Let a farmer begin his improvements this year, and continue them under the supervision of the committee for two years, and then something may be accomplished.

Let the Society set apart twenty-five dollars this year and twenty-five next, and award it as the trustees think best, perhaps in two premiums of thirty and twenty dollars. In this way much good may be secured, the farmer's interest promoted, and agricultural knowledge disseminated.

Your committee have concluded to divide the first premium equally between Samuel Stickney and T. Mabry and Son.

Crops.

John Moulton, Porter, best crop of wheat.
Jos. G. Swan, Denmark, second do.
Jona. Sanborn Fryeburg, third do.

Nathaniel Walker, Fryeburg, best crop rye.
" " " second do.
A. McKeen, " best crop oats.
W. W. Spring, Brownfield, best seed corn.
J. W. Colby, Denmark, second do.
" " " best crop corn.
Jona. Sanborn, Fryeburg, second do.

Statement of John Moulton.

My crop, consisting of 64½ bushels of spring wheat, was grown on 2½ acres, being at the rate of 26 bushels to the acre. The soil upon which it grew was yellow loam, ploughed once with horses, and harrowed smooth. Amount of seed used about 2½ bushels of Malaga wheat. Sowed April 28th. Land planted the year before with corn, and manured only in 1859 with about 15 cords of manure to the acre.

Statement of Joseph G. Swan.

My crop of wheat, consisting of 15 bushels. of 60 pounds to the bushel, was grown on one acre, 110 rods, being at the rate of 26 and four-sixths bushels to the acre. The soil upon which it grew was a fine gravelly soil, with some small stones. The land was naturally rocky, but the most of the rocks have been hauled off. The soil is a deep stony soil, underlaid with a granite ledge. From five to ten feet from the top the subsoil is gravelly, of a yellow cast.

The ground was manured with 6 cords of barn-yard manure to the acre, and planted with corn last year; raised a good crop. After the corn was taken off it was well ploughed, and as soon as the frost was out last spring, it was well harrowed; the first of May sowed to wheat of the Scotch Fife variety. Two bushels on the piece of 270 square rods. No manure used this year. Harvested about the middle of August.

Statement of Jonathan Sanborn.

My crop, consisting of 26 bushels of wheat, 60 pounds to the bushel, was grown on one acre. The soil upon which it grew was a gravelly loam, rather stoney; was planted to corn last year, dressed at that time with eighteen loads of barn manure; bore a good crop of corn. Ploughed after taking off the corn. Cultivated before sowing in the spring, then sowed and harrowed in about the 10th of April. Not any dressing in the spring; no top dressing at all.

Statement of Alvin McKeen.

My crop of oats, consisting of 261 bushels, of 33 pounds to the bushel, was grown on 2 acres, 120 rods, being at the rate of 95 bushels to the acre. The soil upon which it grew was of a fine loamy dark color, eight inches to subsoil. Planted to corn and potatoes the previous year. Sowed the last of April. The land was ploughed or broken up in the fall of 1858. The crop last year was very good. There was 1¼ acre to corn the previous year; had ten cords of heap manure; ploughed the ground last fall. The ground that was planted to potatoes the previous year was 1½ acre. I top dressed on the furrows and harrowed it in, six cords to the acre. Harvested the middle of last August, and it was mowed and raked. Sowed 2 bushels to the acre.

Statement of Joseph W. Colby.

My crop, consisting of 86½ bushels of corn, 56 pounds to the bushel, was grown on one acre, being at the rate of 86½ bushels to the acre. The soil upon which it grew was light loam, stones mostly removed, of a reddish brown color, one foot deep, fine and pliable; hard, gravelly subsoil. Raised on sward land that had previously been down to grass for four years, and cut one tun of hay to the acre. The year before I ploughed it up, used 6½ cords of manure kept in barn cellar, spread and harrowed into the soil. Planted the 15th and 16th of May, 20 quarts of seed to the acre. Eight-rowed seed planted; rows three feet apart, hills two feet apart. Corn planted without soaking. No top-dressing; used about one spoonful of plaster in each hill. Harvested from 15th to 18th of October.

Statement of Jonathan Sanborn.

My crop of corn, consisting of 161 bushels of ears, was grown on one acre. The soil upon which it grew was a gravelly loam. Five-eighths of the acre was planted with potatoes last year, manured lightly: the other three-eights I ploughed last fall and manured with 1¼ cord of manure, spread on and ploughed in and harrowed. Planted about the 25th of May. No top-dressing. Hoed three times.

Statement of J. L. Kimball.

My crop of carrots, consisting of 108 bushels, of 50 pounds to the bushel, was grown on 20 rods, being at the rate of 864 bushels to the acre. The soil upon which it grew was a sandy plain; no pan. The land planted to carrots last year. About two cords of manure spread on and ploughed in. Harvested in October with a spade.

Statement of same, on Ruta Bagas.

My crop, consisting of 170 bushels of ruta bagas, of 50 pounds to the bushel, was grown on 20 rods, being at the rate of 1500 bushels to the acre. The soil upon which it grew was a sandy plain. The land last year was part planted with corn with no manure .part with ruta bagas. Sowed the middle of May with a seed sower. The tops pay for sowing.

REPORT OF MR. BUTTERFIELD.

PHILLIPS, Dec. 4, 1860.

TO S. L. GOODALE, ESQ., SECRETARY, &C.:

Having been appointed a delegate by the North Franklin Agricultural Society to attend the Annual Exhibition of the West Oxford Agricultural Society, I submit the following report:

Having been notified that the Annual Exhibition of the West Oxford Society would be held on the Society's grounds near Fryeburg Corner, on the 9th, 10th and 11th of October, I proceeded thither on the first day of the exhibition, and presented my credentials to the Secretary, Geo. B. Barrows, Esq., by whom I was politely received and introduced to the President and other officers and members of the Society. My first impulse was to congratulate them on the good fortune of their Society in securing so desirable a location—it being in the midst of a fine forest, the underbrush and a sufficient number of the trees having been removed, to permit teams and carriages to move over the grounds without difficulty. The trees remaining on the grounds are mostly second growth white pine, varying in size from six inches to a foot in diameter, and are tall and thrifty. These trees, together with the surrounding forests, are useful as well as ornamental, affording protection from the sun and shelter from the wind. The grounds are enclosed by a permanent fence, and a trotting course graded, and a hall erected within the inclosure.

Having noticed the general appearance of the grounds and the appurtenances thereto, I proceeded to the examination of the neat stock. I regret to say that this department of the exhibition was not so creditable as it should have been. Many of the stalls were unoccupied, and others contained nothing above the mediocrity of our common stock. There were, however, a few superior animals

on exhibition. One pair of fat oxen, measuring about eight feet, owned by Josiah W. Davis, Esq., of Denmark, and being the same that drew the first premium at the State Show in Portland, attracted much attention; also a pair of three years old grade Devon steers, owned by Zenas Thorne, Esq., of Fryeburg, were well matched, and were much admired for their symmetrical form and beautiful color. The President of the Society, Thomas Mabry, Esq., of Hiram, exhibited a well matched and well disciplined pair of working oxen; and there was an excellent town team on exhibition from the town of Denmark. The animals above named are a credit to the Society as well as to their owners; and their superiority is sufficient evidence that the introduction of a few thorough bred animals, together with judicious breeding from the best they now have, would greatly improve the neat stock of West Oxford.

The number of horses and colts on exhibition was not large, yet among them were some valuable animals. There were some fine carriage horses upon the grounds in good condition, and giving evidence of thorough training. I also noticed a beautiful pair of matched horses, of like color, make and step; and several colts, possessing some good points, indicating both strength and speed. I judge that the horses of West Oxford have been judiciously bred and carefully tended.

There were but two flocks of sheep in the pens—one grade Leicester, the other native breed They were both valuable flocks. I was disappointed in not seeing a larger number, and a greater variety of breeds of sheep on exhibition; for I judge that the hills of West Oxford are well adapted to the raising of these useful and profitable animals.

Some very excellent Chester swine were on, or rather *in* the grounds; but the feathered tribe—the geese and turkeys, ducks and hens, were nowhere to be seen; neither did their *music* charm the admiring crowds. This deficiency, however, was supplied by the auctioneers and peddlers who were stationed under nearly every group of trees within the inclosure.

The Drawing Match was not as successful as it should have been. The oxen exhibited strength, but not discipline—only two pairs out of the six competing giving evidence of thorough training; and I regret to say that one or two of the teamsters made rather too free

use of white oak and 'cold iron.' It reflects credit on the Society, however, that its regulations strictly forbid the adjudging committee to award a premium to any man who abuses his oxen.

The Ploughing Match was conducted upon the right principle—the object being to ascertain which team or plough could make the *best work*, limited only to reasonable time and speed, and not which could disturb the largest territory in a given time, or a limited piece in the shortest time, which usually results in the abuse of all concerned—team and teamster, plough, ploughman and land. Turning over the surface of soil in broad layers, or furrows, is by no means pulverizing it, which is the object of ploughing; and that ploughing which most thoroughly accomplishes this object, limited only to reasonable time and speed, and with a reasonable expenditure of power, is unquestionably the best. Several ploughs were tried, all of which made fair work. It was the opinion of good judges, however, that the 'Michigan plough' more thoroughly pulverized the soil than either of the others, although it did not leave the surface quite as smooth.

The Horse trotting was well conducted, although no remarkable time was made—the quickest being 3:11. During the trial of speed there was no whipping or abuse further than the driving of horses, as well as the drawing of oxen, to the utmost of their strength, merely to gratify the pride of their owners, and the curiosity of spectators, necessarily constitutes an abuse. It remains for our agricultural societies, both State and County, to decide whether they will encourage or discountenance these abuses; for they add nothing to the value of the animals, or to the wealth or comfort of society.

The amount of dairy products on exhibition was very small, there being only three specimens of butter and three of cheese presented for examination, most of which were of very superior quality. There should have been a larger display of the products of this important branch of domestic industry.

There were several excellent specimens of corn and wheat in the store-room; but the display of garden vegetables was quite limited. The deficiency in this important department probably arose from the fact that the regulations of the Society allow garden products to be entered for premiums at any time before the first of January—a rule

which I think of doubtful utility, as it deprives the exhibition of a very attractive feature.

The exhibition of fruit was remarkably fine, and gave positive evidence that some of the farmers of West Oxford have not neglected this important branch of farm husbandry. John Moulton, Esq., of Porter, the present member of the Board of Agriculture from this Society, exhibited some twenty varieties of apples, many of which were of superior size and flavor. Other exhibitors equalled Mr. Moulton's in size and flavor, but not in variety.

There were several pieces of agricultural machinery on exhibition, among which I noticed a stump machine and several mowers and reapers, owned by different individuals of the Society. Messrs. Kendall, Whitney & Co., of Portland, by permission of the Society, also exhibited a large assortment of agricultural implements, which added much to the appearance of the wareroom and the interest of the exhibition. I regard this feature of the exhibition as worthy of commendation, for it directs the public mind to the construction and use of labor saving machinery; the employment of which, in any department of productive industry, indicates a spirit of progress.

The 'Ladies' Fair' was well arranged, and reflected much credit on its contributors. The tables and lines were loaded with the substantial articles of household manufacture, of excellent material and superior workmanship, giving evidence of industry, skill, and economy: also beautiful specimens of needlework, indicating taste and refinement. The tables were also adorned with bouquets and house plants of rare beauty and fragrance. The ladies of West Oxford deserve much commendation for this exhibition.

Although not strictly a part of the industrial product of the Society, yet occupying a conspicuous place in the hall and attracting much notice, was a collection of birds and marine animals from the coast of Labrador, together with nets, snares, hooks and spears used by the natives of that country in catching these birds and animals; also a very beautiful collar and wristers of silver down, and mittens, socks, and boots of seal-skin—all manufactured by the inhabitants of that inhospitable clime. These specimens were exhibited by Mr. S. A. Evans, of Fryeburg, and were collected by him while accompanying Prof. Chadbourne of Bowdoin College, in his expedition to the coast of Labrador, during the past summer. The influence of

this exhibition may stimulate other youthful minds to a more careful and extensive study of Natural History—a very important branch of education.

Having been thus particular in my remarks upon the different departments of the Exhibition, I deem it proper to make a few more general observations before closing this report. Although the Exhibition, in some of its features, was not what it should have been, yet taking it as a whole, I see no ground for discouragement. On the contrary, I consider the prospects of the Society very flattering. They have a beautiful location; their grounds are paid for; they are not compelled to tax their members—the receipts from admission fee being sufficient to defray their incidental expenses; they live in a beautiful and fertile tract of country, adapted to the growing of a great variety of agricultural products, and many intelligent and enterprising men are actively engaged in promoting the interests of the Society. I have no doubt that these efforts will be crowned with success, and that West Oxford will contribute its full share to the agricultural wealth and prosperity of the State.

An effort is being made to induce the Society to offer a part of its premiums in the form of agricultural books. This is a step in the right direction; for an agricultural book, well studied, is like seed sown in good ground—it will *bring forth fruit*, even to an hundred fold. Agricultural education is the great want of American farmers, and every enterprise that tends to relieve this want should be encouraged by every lover of progress. And I would here suggest that if our agricultural societies would offer a premium for the best essay written by a female upon the education of farmers' wives and daughters, also for essays upon some of the leading branches of household economy, they would be far more beneficial to the interests of society than many of the petty premiums now awarded to useless articles of fancy.

It may not be improper for me to state that there are excellent farming towns in New Hampshire, adjacent to West Oxford, that are some twenty-five miles distant from the location of the agricultural society in their own county, and not accommodated by that society at all, but within an hour's drive of the show grounds at Fryeburg, which are within half a mile of the State line, and where these towns could be well accommodated. If the legislatures of the

two States should make provision for forming a 'Union Society,' embracing these towns and the West Oxford Society, they would doubtless mutually benefit each other.

In closing this report, I would acknowledge my obligations to the officers and members of West Oxford Agricultural Society, for the courtesy and hospitality I received while attending their Exhibition.

H. O. BUTTERFIELD.

SOMERSET CENTRAL SOCIETY.

This Society, embracing 210 members, held its Annual Exhibition at Skowhegan, 12th, 13th and 14th of September. No report of the Show has been received. From the returns, it appears that among the premiums awarded was the first on stallion, to Alexander Crawford, for a Norman horse from Canada.

Second premium to Amos Garland.

First premium on breeding mare, to G. A. Rowe.

Second " " to B. R. Malbon, for Messenger mare, 25 years old.

For best Short horn bull, to Samuel Hoxie, of Fairfield.

Second best, Rufus Goodrich, of Canaan.

Best Short horn cow to John Law, Canaan.

Second best, to Elijah Hilton, of Anson.

For best Short horn heifer, to Charles Getchell, of Skowhegan, and for second best, to Thomas L. Pratt, Bloomfield.

For best fine wool buck, to J. M. Smith, of Anson.

Second best, to Nathan Weston, of Madison.

Best fine wool ewes, Gardner Malbon, of Skowhegan.

Second best, J. M. Smith, Anson.

For best swine, to Jotham Weston, of Bloomfield.

CROPS.

To N. J. Hall, of Canaan, for 90 bushels corn on one acre.

To John Weston, Bloomfield, for 19 bushels wheat.

To Thomas L. Pratt, 58½ bushels barley, on one acre.

To R. A. Davis, Norridgewock, for 277 bushels of Gilliflower potatoes on one acre (16,620 lbs.)

To N. J. Hall, for 325 bushels Orono potatoes on one acre.

To the same, for 224 bushels carrots on one-fourth acre.

To J. Weston, for 120 bushels carrots on one-fourth acre.

NORTH SOMERSET SOCIETY.

The Secretary, T. F. Boothby, of Embden, writes as follows:

"This Society now embraces 145 members. Its Annual Exhibition was held at Solon village, on the 10th and 11th days of October. There were 127 head of neat cattle entered for premiums, including oxen, steers, bulls, cows, heifers and calves; besides a large number present not entered. Thirty-five horses and 82 bucks, sheep and lambs, 12 swine. The show was very good; fully up to any former one. There was a large number of cattle on exhibition and some very fine ones. They were mostly grade Durham and Hereford. A few Devons have been introduced lately. There has been a decided improvement since the Society was organized. Quite an interest is taken in the raising of sheep. A number of grade Spanish bucks have been brought into the limits of the Society, and one full blood Spanish buck has been lately brought from Vermont, which will greatly improve our flocks. Corn, grain and potato crops have been good, generally; better than for several years past. Ladies' manufacture was not as large as usual, but would well compare in quality."

Among the premiums awarded were the following:

To Josiah French, Jr., of Solon, for best breeding mare, Morgan and French.

To R. S. Howes, of Moscow, for second best do., Messenger.

The first premium on bulls, was awarded on one stated to be a grade.

The second to Jotham Whipple, of Solon, for a 2 years old Devon, bred by Josiah Wentworth.

For best milch cow, to H. W. Bosworth—yielded in best months 22 quarts per day.

For second best, to T. F. Chase, for a grade Durham, 8 years old, weight 1192 lbs., said to give in June 30 qts. per day.

Swine. White Chesters were shown by O. H. McFadden, of Embden, and Wm. Doran, of Solon.

Sheep. Jotham S. Goodrich, of Bingham, first and second premium on Spanish Merino buck and ewes.

John Dinsmore, of Concord, second premium on Spanish Merino bucks.

Fruit.

Jotham Whipple, of Solon, showed 15 varieties of apples, and 5 of pears—the latter from trees on quince stock.

Crops.

Indian Corn. First premium to T. F. Boothby, Embden, for 140 bushels ears on one acre sward land, broken the fall before, and manured in the hill.

Second premium, to J. S. McIntyre, of Bingham, for 133 bushels of ears on one acre sward land, manured with what was taken from under an old barn which had stood for fifty years—a shovel full to the hill, with a little plaster and leached ashes.

Wheat. First premium to Corydon Felker, of Concord, for crop of 32 bushels per acre—Canada club wheat; land in corn the year previous; soil, a rocky loam.

Second premium, to Josiah French, Jr., Solon, for 24 bushels red bearded wheat on one acre—land in corn last year, and lightly manured; 60 lbs per bushel, seed 1½ bushels.

Barley. First premium to Jotham Whipple, Solon, 42½ bushels per acre of 53 lbs. per bushel—4469 lbs. on two acres; land in corn last year.

Second premium, to Heman Whipple, for 137 bushels of 52 lbs. on three acres.

Third do., to Eastman Hathorn, for 35 bushels per acre; also, to the same, first premium on oats and peas, 49 bushels to the acre.

Potatoes. First premium to T. F. Boothby, of Embden, for 465 bushels on one acre—land broken last fall; 7 cords manure applied, and 5 cords put in the hills.

Second premium, to J. S. McIntyre, Bingham, for 257 bushels per acre.

Third do., to Stephen Merrill, Solon, for 212 bushels on an acre.

Ruta Bagas. Jotham Whipple, 216 bushels on one-fourth acre; and to the same, for 85 bushels of oats on one acre.

Mr. Whipple says:

"The soil upon which they grew was alluvial, or interval. It was an old mortgaged piece of land; or in other words, a piece on which the trees were cut off years gone by, and never cleared till the past season, when I went to work and cut the bushes and piled up the old logs, and burned them off, and ploughed the land. This spring I sowed four bushels of oats, about the first of May, and harrowed them in. The ground was well pulverized. Harvested about the 20th of August."

WEST SOMERSET SOCIETY.

The Secretary, Albert Moore, writes me as follows:

"This Society now embraces 223 members, 31 new ones having been added during the past year. Its Annual Exhibition was held at Anson, on the 3d and 4th days of October.

Since our Show last year, this Society has made rapid progress. We have secured a show ground and trotting park upon a beautiful spot of twenty acres, well enclosed with a high fence, permanent fixtures for stock, and one of the best trotting tracks in the State.

This was our first Show and Fair upon the enclosed grounds. The cattle show, on Wednesday, was by far the largest ever held in this county. The whole number of animals entered for premiums was 748, viz: 44 yokes of oxen, 44 pairs of steers and steer calves, 34 cows, 35 heifers and heifer calves, 9 bulls and bull calves, 4 stallions, 10 breeding mares and carriage horses, 30 colts, 443 sheep bucks and lambs, 4 boars, 1 sow and 2 litters of pigs. The cattle were mostly grade Durhams. A few noble specimens of Herefords and Devons were shown. The exhibition of sheep was very large, and of a superior quality; mostly of the Spanish breed. Great interest is taken in raising sheep, and is considered by our farmers the most profitable of any branch of farming. Horses are receiving some attention, and some fine animals were exhibited.

The Fair, on Thursday, was a partial failure, on account of a pouring rain, with nothing but a temporary tent for a shelter. The articles offered for exhibition, notwithstanding the rain, were quite numerous, and showed that a great interest is taken in this department by the farmers' wives and daughters.

No premiums were offered on crops; but in this department of agriculture, there is a growing interest, and the past year has blessed the husbandman with a bountiful crop of everything save hay. The corn crop has been good; barley and oats excellent; potatoes never better, and wheat, so far as sown, is better than for

years before. There is a perceptible improvement in all departments of farming, which, in a great measure, is attributable to the influence of the agricultural societies in our midst."

Some of the premiums awarded were as follows:

To Benjamin Weston, of Madison, for best stallion,—Morgan and English.

To Elijah Hilton, of Anson, for second best

To Wm. H. Brown of Anson, for best breeding mare, (a Black Hawk.)

To E. S. Hopkins, of New Portland, for best Devon bull, bred by I. Wentworth.

To the same, for two Devon cows, bred by J. F. Anderson, South Windham.

Mr. Hopkins, in his statement, says "that the Devons, when bred to milk, yield well and give very rich milk; that they are well adapted to our climate and rough pastures; that the oxen prove excellent workers, girting 6½ to 7 feet, and make the best of beef."

B. F. Hilton, of Starks, for grade Hereford bull and cow.

Samuel W. Tinkham, of Anson, best milch cow, yield not given in the statement.

To the same, for best fine wool buck.

" Wm. R Flint, North Anson, for second best do.

" Joseph M. Smith, for best fine wool ewes.

" Wm. R. Flint, for second best do.

" J. M. Smith, for best 25 fine wool sheep.

" Wm. R. Flint, 25 second best.

Mr. Flint, in his statement, says:

"Their average weight is something over one hundred pounds. The weight of fleece, well kept, will be seven pounds of wool when washed, and sells quick at 50 cents per pound. Their lambs sell at from $5 to $10 each, for keeping purposes. I cut 1500 pounds of wool from three hundred sheep, including about seventy lambs, which sold at 50 cents washed—something less for a few fleeces unwashed. I consider this breed, (the Spanish Merino) the best and most profitable sheep in this State, or in any other State. They consume the least food according to their weight of any other kind; are tough and hardy; will be kept in large flocks, and retain their flesh better than any other kind. I seldom lose two per cent. by wintering.

EAST SOMERSET SOCIETY.

The Secretary reports as follows:

"This Society now embraces 167 members. Its Annual Exhibition was held at Hartland, on the 11th, 12th and 13th days of September, 1860. We had a good show of neat stock and horses, but not as many in number as last year. There were entered for premiums 128 head of neat stock, 70 horses and colts, 24 sheep and 10 swine. The stock was very good. We have not any full blood animals within the limits of our Society. Our young stock is mostly grade Herefords, with a very small sprinkling of Devon and Durham. The statements I send you are few in number to what they should be, and very imperfect. The members of our Society live over a large territory; they come together on the day of the show, not knowing, many of them, that it is necessary to file a statement. We get what we can, and return the same. The reports are as meagre as the certificates. The show of dairy products was large and excellent. The exhibition of domestic manufactures was the largest and best we have ever had. The exhibition of field crops was very good. The season has been very dry, but our crops very good, with the exception of hay, and that a fair crop. The farmers in our vicinity are taking much more interest in farming than usual. Our grain crop exceeds any that we have ever raised before.

THOMAS FULLER, *Secretary.*"

The first premium on stallion was awarded to Charles Proctor.

First on breeding mare, to Lawrence Williams; second to Seth Webb, St. Albans.

First premium on bull, to Warren Fuller, of Pittsfield, for grade Hereford.

First on milch cow, to James Fuller, of Hartland—gives 12 qts. at night in good feed.

CROPS.

Indian Corn. First premium to Ephraim Bachelder, of Palmyra, for 74 bushels of 58 lbs. each on one acre.

Second to Alfred Robinson, of St. Albans, 188 bushels of ears.

Third to C. B. Stinchfield, of St. Albans, 56¼ bushels—4 bushels beans, and 6 loads pumpkins from an acre.

Wheat. First premium, to Alfred Robinson, St. Albans, 26 bushels per acre.

Second to Warren Fuller, for 26½ bushels on one acre.

Third to Calvin Blake, Hartland, for 26¼ bushels.

Barley. G. W. Hubbard, Palmyra, for 45 bushels per acre.

Second to Elijah Leach, St. Albans, for 41½ bushels on an acre.

Rye. First premium to C B. Stinchfield, St. Albans, for 37 bushels on an acre.

Second to Wm. M Palmer, Palmyra, for 25 bushels on an acre.

Calvin Blake, Hartland, grew 21 bushels on one-half acre—in good condition.

Oats. First premium to E. Batchelder, for 64 bushels of 34 lbs., on one acre.

Potatoes. D. F. Libbey, Detroit, for 275 bushels on one acre, (Jacksons.)

J. C. Webb, for 267 bushels on one acre.

Ellis Fish, St. Albans, 200 bushels on three-fourths of an acre, (Jacksons.)

C. B. Stinchfield, 210 bushels on one acre, (Jacksons.)

Carrots. Ellis Fish, for 45 bushels on one-sixteenth acre.

Beets. Thomas Millett, Palmyra, 37½ bushels on one-sixteenth acre.

G. W. Hubbard, of Palmyra, 37 bushels on one-sixteenth acre.

Ruta Bagas. D. F. Libbey, of Detroit, for 249 bushels on one-fourth acre.

Warren Fuller, Pittsfield, 153 bushels one-fourth acre.

Ellis Fish, St. Albans, 130 bushels on one-fourth acre.

Peas and Oats. Ellis Fish, St. Albans, raised 123 bushels on 2 acres and 100 rods, or 46 bushels per acre.

PISCATAQUIS CENTRAL SOCIETY.

This Society held its Annual Exhibition at Dover, 3d and 4th of October. As the reports of awarding committees returned to this office give only numbers and not the names of owners, none are here given. Among the premium crops may be named the first on wheat, which was given to Byley Lyford, Jr., of Atkinson, for 25 bushels per acre—Java wheat.

Second premium to Timothy Hazeltine, of Foxcroft, for 23¾ bushels white bald wheat per acre.

Indian Corn. A. J. Chase, of Atkinson, 112 bushels ears on one acre.

Barley. Daniel Hewettt, of Sebec, 92½ bushels on 1½ acres.

T. Hazeltine, of Foxcroft, 41¼ bushels per acre.

Potatoes. Daniel Hewett, Sebec, 250 bushels on one acre.

Ruta Bagas. A. J. Chase, 273 bushels on one-fourth acre.

WEST PENOBSCOT SOCIETY.

This Society held its Annual Exhibition at Exeter, Sept. 25 and 26, 1860. The Secretary writes that a powerful rain storm prevented many from attending and contributing. The amount of stock shown was less, consequently, than in some former years. The quality of that shown was very good. More sheep than usual, including some South Downs purchased of Whittier, of Vienna, by Mr. Bragg, of Charleston. Dairy products fine, and the display of fruit excellent.

Among the premiums were the first to Albert G. Tibbetts, for a Drew stallion.

Second, to Chauncy Cochran, of Corinth.

First on breeding mare, to John Andrews, of Exeter.

Second, to Jonathan M. Edney, of Corinth.

First for Devon bull, to P. W. Butters, of Exeter.

Second " " to O. D. Chapman, Exeter; both bred by Wentworth.

First on Devon cow, to E. C. Morrill of Corinth.

First on Short horn bull, for Uncas, 3515, A. H B, bred by himself. from a stock said to be of remarkable excellence for the dairy, to Isaac W. Case, of Kenduskeag—"roan color; calved May 2, 1857; got by Bay State 237, out of Stella, by Cosmo, 1398—Clota, by Young Comet, 2428—Spot, by imported Young Fitz Favorite, 2428—Kate, by imported Banquo, 1226—Judy, alais Betty, imported by Henry DeGroot, New York."

Second, on Short horn bull, to Edney & Barker, Corinth, 1 year old, bred by Warren Percival, Vassalboro'.

For best Short horn cow, to I. W. Case, Kenduskeag. Her pedigree, as recorded in the American Herd Book, is as follows:

"*Alice 4th.* Roan color; bred by Wm. Cushman, New Braintree, Mass Calved April 8, 1854; got by Murat 729, out of Alice 3d, by Logan 95—Alice 2d by Prince Albert 84½—Alice, by Splendid (5297,)—Danse by Carlos (1787,)—Dewdrop, by Charles (878,)—imported Dulcibella, by Frederick (1060,)—Delicia, by Major (2252,)—by Comus (161,)—by Marske (418.)"

Milch Cows.

First, to S. D. Jennings,—no statement of yield.

Second, to E. S. Hunting,—no definite statement; says that from two cows he made 230 lbs. butter for sale, besides supplying a family of six, and twelve cheeses besides.

Crops.

Wheat. First premium to Thos. H. Norcross, of Charleston, for 51 28-32 bushels summer wheat on one acre,—in corn last year, and highly manured.

Second, to M. E. Rice, of Stetson, for crop of 31 bushels per acre, on burnt land.

Indian Corn. First premium to E. F. Crane, of Kenduskeag, for 145 bushels of ears on one acre.

Second, to Charles H. Hayes, of Exeter, for 141 bushels ears on one acre.

Third, to M. E. Rice, of Stetson, for 372 bushels shelled corn on six acres,—10 bushels beans and 20 loads pumpkins on same land.

Barley. T. H. Norcross, 56 bushels and 13 quarts on one acre,—land in potatoes last year; well manured.

Chauncy Cochran, of Corinth, 55 bushels (of 53 lbs. each,) on one acre,—land in corn last year, with eight cords manure; none this year.

M. E. Rice, Stetson, 203 bushels on four acres,—in corn last year; had seven acres more not threshed at time of statement; a part of it supposed to be quite as good, and the rest about 40 bushels per acre.

E. F. Crane, of Kenduskeag, 47½ bushels, of 48 lbs. each, on one acre.

Asa Shaw, Exeter, 41 bushels per acre.

Buckwheat. E. F. Crane, 35 bushels on one acre.

Peas and Oats. M. E. Rice, 74 bushels per acre,—six acres. Greensward (bearing 1½ tons hay per acre,) broken in November, 10 inches deep; cultivated in spring, and sown with 3 bushels seed and 2½ bushels gypsum per acre.

Potatoes. First premium to E. F. Crane, for 340 bushels Orono

potatoes on one acre,—land in grass six years previous; broken in spring; 4 cords manure in hill.

Second, to M. E. Rice, for 274 bushels on one acre, (20 acres averaged 155 bushels per acre,—10 acres had 12 loads barn manure per acre, and a spoonful plaster to the hill; 10 acres had the plaster only.)

Third, to M. L. F. Walker, of Exeter, for 191 bushels potatoes and $4\frac{3}{4}$ bushels beans on one acre.

Fourth, to Asa Shaw, Exeter, for 181 bushels on one acre.

E. B. Stackpole, Kenduskeag, $108\frac{1}{2}$ bushels Jackson's on half an acre.

Mr. Stackpole showed 35 varieties of potatoes, and 45 of other vegetables.

Carrots. E. F. Crane, 210 bushels Long Orange carrots on one-fourth acre,—the land has been in same crop for five years past.

WALDO COUNTY SOCIETY.

The Annual Show of this Society was held at Belfast, 10th, 11th and 12th of October. During the year past, this Society has purchased and enclosed grounds (22 acres,) and made a half mile track. The funds needful were raised by life membership. They propose to erect a building next year by the same means.

Among the premiums awarded were first premium on stallion, to Wm. Murrey, of Freedom.

To Charles O. McKenney, for second best.

" George Morrill, for best breeding mare.

" Wm. Hilt, for second best.

" Hiram Seavey, Prospect, for Short horn bull, 3 years old.

" Edmund P. Brown, for fine wool buck.

" Thomas McKinley, for long wool ewes.

" Daniel L Pitcher, for breeding sows.

CROPS.

To B M. Hawkins, Waldo, for 102½ bushels Indian corn on one acre,—no statement made except of amount.

To Albert E. Clark, Belfast, 64 bushels.

" James A. Wilson, Belfast, 52 bushels.

Wheat. Wm. Taber, of Unity, for 36 bushels on 1¼ acres.

Jason Hills, Lincolnville, 45 bushels on 2¼ acres.

Barley. Luther M. Smith, Belfast, 56 bushels on one acre.

R. Drinkwater, Northport, 62 bushels on 1¼ acres.

Oats. E. P. Brown, Belfast, 102 bushels on 2½ acres.

Potatoes. Daniel L. Pitcher, first premium for 62½ bushels on one-eighth of an acre,—being at the rate of 500 bushels per acre.

Second premium, to S. F. Shaw, for 347 bushels on one acre.

Third, to Timothy T. Roberts, of Brooks, for 320 bushels on one acre.

Carrots Robert Patterson, 575 bushels on one-half acre, being at the rate of 1150 bushels per acre.

Mangolds First premium, to J. H. Stephenson, for 100 bushels on one-eighth of an acre

Second, to Daniel Pitcher, for 100 bushels on one-eighth of an acre.

Third, to Jason Hills, Lincolnville, for 100 bushels on one-eighth acre.

Ruta Bagas. First premium, to Robert Patterson, Belfast, for 400 bushels on one-half acre.

Second, to David Norton, Montville, for 200 bushels on one-fourth acre.

Third, to T. T. Roberts, of Brooks, for 199 bushels on one-fourth acre.

HANCOCK COUNTY SOCIETY.

The Secretary writes as follows:

"The Annual Exhibition was held upon the Fair ground, Ellsworth, October 3d and 4th. The weather was stormy, consequently there were not as many in attendance as there otherwise would have been. But notwithstanding the unfavorable weather, there were more than two thousand present on each day of the Exhibition. The stock upon the ground was better than at any previous exhibition. There were pure blood Devons, Durhams and Herefords, showing that much improvement has been made in the breed of animals since the organization of the Society. A hall has been erected upon the grounds the past season, 75 feet long, 32 wide, and two stories high.

A. M. GLIDDEN, *Secretary.*"

Among the premiums awarded were first on stallions to Aaron G. Page, of Bucksport.

First on breeding mare, to John L. Demeger, of Ellsworth.

Second, to John Armstrong, of Ellsworth.

For best Devon bull, to Simeon B. Higgins, of Orland,—bred by P. L. Hill.

For best Devon cow, 5 years old, to Peter L. Hill, of Goulds-boro',—bred by Wentworth.

To the same, for two Devon heifers, bred by himself.

To Willard P. White, Orland, for Hereford bull, 2 years old, bred by himself.

To Stephen H. Kench, of Dedham, for Hereford heifer.

To Parker & Pearl, Dedham, for best Short horn bull, 5 years old, bred by Wadsworth, of Livermore.

To Samuel Wasson, of Franklin, for best Short horn cow, 9 years old, bred by A. H. Buzzell, Amherst.

To Parker & Pearl, Dedham, for Short horn heifer, 2 years old, bred by Geo. L. Cox, Amherst.

To Eben Clark, Hancock, for long wool buck, bred by Perley, of Woodstock, N. B.

To Parker & Pearl, Dedham, for Suffolk boar.

CROPS.

Indian Corn. First premium, to James G. Moor, of Waltham, for 37½ bushels on one-half acre.

To John Armstrong, Ellsworth, for 29 bushels on one-half acre.
To Trufant Butler, Hancock, 25 " " "

Barley. S. P. Donnell, Franklin, 18 bushels on one-half acre.

Beans. John Armstrong, 12 bushels on 51 square rods.

Potatoes. First premium, to John Armstrong, of Ellsworth, for 253 bushels Jackson potatoes on one acre.

Second, to H. S. Trevett, of Trenton, for 126 bushels on 88 rods, (229 bushels per acre.)

Carrots. John Armstrong, 44 bushels on 10 square rods.

Mangolds. To the same, for 46 bushels on 10 square rods.

CUMBERLAND COUNTY SOCIETY.

This Society, embracing 697 members, held its Show at Bridgton, 17th and 18th of October. The Exhibition was a successful and creditable one.

Among the premiums awarded were the following:

To M. D. P. Caswell, of Harrison, for best stallion.

" Edward Bray, of Harrison, for second best.

" E. F. Fessenden, of Bridgton, for best breeding mare.

" E. T. Wardwell, for second best.

" John F. Anderson, So. Windham, for best Devon bull.

" " " " " for best Devon cow.

" J. P. Perley, So. Bridgton, for best Hereford bull.

" Henry Smith, for best Short horn bull.

A fine Ayrshire heifer was shown, the property of S. L. Goodale, of Saco.

Crops.

To Wm. F. Fessenden, of Bridgton, for 76 bushels Indian corn per acre.

To J. P. Perley, Bridgton, for 69 bushels.

" Wm. H. Larrabee, Bridgton, for 63 bushels.

" R. Hobbs, Harrison, for 40 bushels Scotch Fife wheat per acre.

" Nath'l Potter, Bridgton, for 70 bushels oats per acre.

" D. G. Loring, North Yarmouth, for 56 bushels oats on one acre.

Good crops of roots are reported, but the statements being deficient, no premiums were awarded.

WASHINGTON COUNTY SOCIETY.

The Secretary writes—

"This Society now embraces 568 members, 17 new ones having been added during the past year.

Its Annual Exhibition was held at Pembroke, on the 25th and 26th days of September, and brought out a good display of the *substantial* products of agricultural industry.

The Show exhibited improvement in quality rather than quantity. The number of entries falls a little short of last year—being only 463 this year, 475 last year. Quite a large proportion of the young stock shows the Devon blood. The only thorough bred animal on the ground was a young Jersey bull, owned by the Secretary; but almost all the stock is claimed to be grades of Durham, Devon, Ayrshire, &c.,—probably far removed. The young horses are showing the good results of the importation of Black Hawk and Messenger blood, though 2:55 is the highest speed they have been able to attain. The exhibition of household manufactures was mostly composed of substantial articles of comfort. The dairy products, for quality, cannot be beat in the State,—and of fruit, the show was very respectable, for Washington county. Good order and good humor prevailed. The Address was by Mr. Caldwell, of East Machias. The general features of the past season, or *the feature*, was drought,—the amount of rain being only $2\frac{3}{4}$ inches in April, $1\frac{1}{4}$ inches in May. Then in the first ten days of June we had $6\frac{1}{4}$ inches; and after that, only $1\frac{1}{2}$ inches till the last of July. The result is, a falling off of the hay crop 50 per cent; grain of good quality, but thin, and small yield; straw light; turnips almost universally a failure, except very late ones.

WM. D. DANA, *Secretary.*"

Mr. Dana, in his statement on Jersey bull, which received first premium, says:

"The peculiar merits of this breed consist in the richness of the milk and the excellence of the butter,—this butter selling in Bos-

ton market, and wherever known, for 50 to 100 per cent. above other butter made under equal circumstances. Sold this summer in Boston for 30 cents, when other lots sent by the same person, and sold by the same person, sold for 12½ to 25 cents.

I never knew a Jersey cow to produce less than a pound of butter a day, in good feed, for two or three months after calving; and some accounts claim 20 pounds a week. I can only answer to 10 pounds, from my own knowledge."

Crops.

First premium on wheat, to Hugh Porter, of Pembroke, for 19 bushels on one acre.

First premium on oats, to Aaron Frost, Perry, 65 bushels on one acre.

Second on oats, to Henry Stickney, Perry, for 64 bushels.

To Wm. D. Dana, for 11½ bushels beans on five-eighths acre.

" Hugh Porter, Pembroke, for 285 bushels potatoes on one acre.

" Aaron Frost, for 116¾ bushels on one-half acre.

" Wm. D. Dana, for 167 bushels carrots on five-sixteenths acre.

" To the same, for 125 bushels golden field beets on one-fourth acre.

To Lucas W. Gardiner, of Pembroke, for 300 bushels ruta bagas on 65 square rods.

As remarked by the Secretary, few crops competed for premiums, and few of these would have been considered more than ordinary, except for the severe drought.

EAST WASHINGTON SOCIETY.

This Society, now embracing 223 members, held its Annual Exhibition at Calais, Oct. 3d and 4th.

D. K. Chase, Esq., chairman of Trustees, writes as follows:

"Notwithstanding our returns do not give evidence of our having had much of a show, I think that in regard to general interest, and good influence, few if any exhibitions in the State, excelled ours. Good feeling and pleasing excitement were kept up through both days of the fair, and it is evident our farmers received a stimulus which will be decidedly beneficial.

As to the stock and farming products on exhibition, the amount, we think, was larger than at any other fair ever held in this county.

The show of roots and other vegetables, was exceedingly good. Fruit good for this region, (apples are not raised to much extent here.) Of manufactured articles, there was a good show, particularly of the ladies' handi-work. The show of horses was good. A great number of colts, from four months to four years old, were on exhibition; most of them had Morgan blood in them, and were very good samples. The neat stock was nothing to be proud of. There was a goodly number of all ages, but generally of inferior quality. Our farmers have been extremely loose in managing this branch of their business. We have but few if any full blood bulls or cows of any breed, in this whole county; and what we have, or the best we have, are poorly patronized,—*worse* than that; our farmers are quite likely to kill their best calves, because they make better veal, and raise their meanest ones. We have reason to hope, however, that there will be a reform in this respect. Our farmers talk like pursuing a course more for their credit and interest.

The show of sheep was very good, considering the limited number kept in this vicinity. The breed is of the coarse wool kind. The original stock was imported on to this river from England by our provincial neighbors, and additional importations have been made

every few years. As a whole, our sheep may be said to be large, well formed and hardy. Sheep raising would be the best business our farmers could go into, if it were not for the abundance of half starved and useless dogs amongst us. I think the dogs have killed one-third of what have been raised for the last four years. Cannot our legislators be induced to make a law which would abate such a nuisance?"

Among the premiums awarded are the following.

For best stallion, to S. B. Berry, & Co., Calais.
" second best do., to J. W. Hartford, Perry.
" best breeding mare, E. C. Gates, of Calais.
" second best do., to Daniel Hill, Calais.
" best Short horn bull, to Jos. Godfrey, Calais.
" best buck, to R. M. Todd, Calais.
" second best do., B. Shattuck, Jr., Calais.
" best ewes, to John Gardner, Calais.
" second best do., J. D. Larobe, Baileyville.
" best boar, to John Linihen, Calais.
" second best do., to Cyrus Thompson, Calais.
" best breeding sow, to Calvin I. Hall, Calais.

Fruit.

A very fine show, for this section of the State, was made by Levi Whitney, of Calais, including apples, pears, plums and grapes. Of the latter, he says, "I have succeeded in ripening fruit every season since my vines began to bear." This is secured mainly by a good exposure, and *thinning out the fruit to one bunch* on a shoot.

Crops.

Premiums were awarded for the usual crops, but statements regarding the amount grown, and mode of culture, were not found among the returns, except on carrots. E. G. Gates grew 11½ tons on a piece 9 rods by 11, and sold them at $15 per ton.

WEST WASHINGTON SOCIETY.

The Secretary writes—

"This Society now embraces 261 members, 81 new ones having been added during the past year.

Its Annual Exhibition was held at Jonesboro', on the 27th and 28th days of September.

The attendance was quite large, notwithstanding the weather was unfavorable, and a good deal of interest was manifested in the show. Perhaps the exhibition of neat stock did not fully meet the expectations of those most interested in the Society, yet it was quite as good as could be looked for under the circumstances, although not up to that of last year. The show of horses was, on the whole, rather better than that of last year. Some very fine family horses and draft horses were on exhibition. I am very sorry to report no swine on exhibition, but cannot think that interest in the improvement of that class of animals is in any way abated. Very few sheep were shown, and those of mixed breeds. Our Society is yet too young, just in its infancy, for its influence on agricultural production to be perceptible. There is a decided interest felt in the improvement of the various classes of animals bred for domestic purposes, and the Society is doing something to effect that. The past season has been unusually dry, and the crops have generally suffered for want of moisture. Farmers have realized not more than two thirds of their usual crop of upland grass, while on the lowlands, meadows and intervales, the crop has been about an average. Wheat, for a number of years, has been nearly a failure. Oats and barley have done well. More potatoes have been harvested in this vicinity this year than in any season for fifteen years, and they have been but little affected with the "rot."

JAS. S. BUCKNAM, *Secretary.*

Among the premiums awarded, were the first on breeding mare to John E. Holway, of Machias, and the second to N. W. Kilton, of Jonesboro'.

For shorthorn bull to John F. Pineo, of Columbia.

No competition for premiums on crops.

NORTH AROOSTOOK SOCIETY.

This Society held its Exhibition at Presque Isle, Oct. 3d and 4th. The Secretary writes, "Our show of stock was not so large as some former years, owing to bad roads from heavy rains; yet we had some fine cattle and horses on exhibition. The Fair was the best we ever had. We had specimens of blacksmith work hard to be beat, and we had boots, leather and harnesses not be surpassed in the State; and best specimens of satinetts and flannels, in fact there was no trade that was not handsomely represented. There were no entries for crops. This has been a first rate season for crops of all kinds We had at our Fair some beautiful specimens of corn, beans, wheat, garden vegetables, &c. The immigration continues to flow into this county, we are filling up with a good, hardy set of men and women."

Among the premiums awarded are the following:

For best stallion, to C. Kidder, for an Eaton horse.

Second premium to Daniel Foster, for a Messenger.

First premium on breeding mare, to George Foss.

Second " " to C. F. A. Johnson, (both Morgans).

No full blooded neat stock seems to have been shown. A bull owned by John Allen took first premium, and is described as nearly full blood Durham.

For best milch cow, to Eben Richardson; average yield for ten months, 10 quarts per day.

First premium on long wool buck, to Francis Miller.

Do. on ewe sheep, to H. C. Howard, Perley breed, (Leicester).

No swine exhibited. No statements on crops are returned.

PENOBSCOT AND AROOSTOOK UNION SOCIETY.

This Society held its exhibition at Patten, 10th and 11th October. The following report is furnished by the Secretary:

"The exhibition was a very good one and shows increasing interest in the objects of the Society.

On the first day the stock was exhibited, comprising a greater number of excellent horses, oxen, steers, cows, heifers and other animals, than we have ever seen together in this place before. The number of oxen and steers was unusually large, among them were some fine animals. A Durham bull, three years old, owned by Alfred Cushman, Esq., of Golden Ridge, was thought to be as good as any in the State. A Grade Durham bull, owned by Jesse Craig of Island Falls; two Durham cows owned by Mr. Laughton were valuable animals. Valuable horses were exhibited by Jesse Craig, Ira Fish, Esq., Samuel Wiggin and Francis Weeks.

Several flocks of sheep, crosses of the Leicester and Southdown were exhibited. A Dishley buck and ewe, owned by J. S. Mitchell, are valuable for superiority of the wool, and from their large size, for mutton.

The swine on exhibition were a cross of the Suffolk, few in number, but large and valuable animals.

The Ladies' Fair was not as large as usual, but the articles exhibited were of a better quality.

Among the household manufactures were flannels, frocking, satinets, &c., which were creditable to the industry and skill of our women.

The grain crop this year was unusually good. Wheat gave a great yield. The weevils and rust did no injury. The season was cold and dry and seemed to favor its growth. Experience seems to prove conclusively that wheat in this climate, sown in April or on the first days in May, is most likely to do well.

The oat crop was very large and the grain full and heavy. The drought in the early part of the season appeared to lessen its growth. It headed out low, but this did not injure the value of the grain.

A large quantity of buckwheat was raised this year. Buckwheat does not exhaust the soil so much as many other crops. It requires pretty good land, and should be sown before the 15th of June. Buckwheat meal mixed with boiled potatoes is profitable for fattening pork and beef.

More good sound corn was raised this year than ever before in this vicinity.

The rye crop was abundant; it does well both on plowed and burnt land.

Barly succeeded well. Barley when cut early and secured from rain makes white and sweet flour, and is a good substitute for wheat in a country where the wheat crop often fails.

Pork raising in this country where buckwheat and potatoes grow almost spontaneously is profitable. Large hogs are very common with farmers.

Sheep raising is profitable, and is beginning to be a prominent business within the limits of this society. Large flocks of sheep are common.

The apple crop this year was large. Our apple trees, in many instances, were loaded heavily and required props. Alfred Cushman of Golden Ridge, and Ira Fish, Esq , of Patten, raised abundant crops.

There was a great yield of potatoes, and excellent in quality. The rust and rot did no injury."

LUTHER ROGERS, *Secretary.*

Among the premiums awarded are the following:

To America Robbins of Patten, for best stallion.

To Ivory B. Gerry, Golden Ridge, for best breeding mare.

To H. B. Hersey, Patten, for second best do.

To Alfred Cushman, Golden Ridge, for best Short horn bull three years old.

To Wm. Leslie, Patten, for best long woolled buck.

To John R. Hammond, Patten, best breeding sow.

To Joseph Heald, for 40 bushels Indian corn, on 5-8ths of an acre.

To Alfred Cushman, for 80 bushels Indian corn on one acre.

To Hiram F. Grant, for 29 bushels wheat on one acre.

To Edmund Jay, for 19½ bushels on one-half acre.

To C. Carpenter, for 26 bushels on one acre.

To Wm. Chase, Patten, for 184 bushels potatoes on one-half acre.

Mr. M. L. Gerry of Golden Ridge, reports the following experiment in wheat culture:

"Having failed for years to grow any wheat on that part of my land lying on Molunkus river, (owing to mildew and blight) and learning that Mr. Cary of Houlton succeeded by very early sowing, I sowed white-bald (spring) wheat on the 11th November—having ploughed and harrowed, after taking off a crop of corn. As soon as the snow was off in spring the wheat was up green and flourishing, except on a part where the snow did not lie through the whole winter, and were it not for this, I think there would have been at the rate of 30 to 35 bushels to the acre. As it was, it yielded at the rate of 25 bushels, and of as plump and handsome grain as I ever saw. The land was not highly manured; the original growth chiefly spruce and fir."

REPORTS ON ASSIGNED TOPICS.

On Surface Manuring and Top Dressing.

BY GEO. A. ROGERS, TOPSHAM.

Having been requested to present my views upon the above topic, I will say in the outset, that what I offer are simply my own views, to be taken for what they are worth, and no more. I do not claim to be an oracle in agricultural matters by any means.

I suppose there is not much difference between top dressing and surface manuring; if there is I am unable to discover wherein it lies. I conclude, however, that by the term surface manuring, is usually meant the putting of manure at or near the surface, in distinction from ploughing it deeply under as is frequently practiced, and by top dressing, is understood the practice of applying manures strictly upon the surface without covering at all.

My own view in regard to the proper application of manure is, that it should be *well incorporated with the surface soil.* I think it is a mistaken idea, although I am aware it is a very prevalent one, that the manure must be directly under the plant, in order that it may derive the greatest benefit. Nature has given the plant power to send out its roots in all directions, or in a particular direction if necessary, in search of its own peculiar aliment. And these roots are not simply single branches, but as they extend themselves from the parent stalk, they are continually sending out little rootlets to drink in the nourishment necessary to sustain and mature the growing plant. As a general thing the more roots a plant has the more thrifty it will be, and that application of manure, which will most encourage the formation of the rootlets, will be the most remunerative to the husbandman. All plants receive their food dissolved in water, and whatever manure may be applied to the soil, it cannot become plant food until it decomposes and becomes soluble. Now it seems to me, if the manure is placed at or near the surface,

the soluble parts will be carried down with every rain, and be more intimately and perfectly mixed with the soil, than by any other disposition of it. I am aware that many are opposed to this mode of applying manure, supposing that there is a loss of ammonia and other gases. But I believe practice has almost invariably shown better results of crops from manure well incorporated with the immediate surface soil, than when buried to any considerable depth by the plough.

I am not prepared to recommend the practice which is being adopted by many very observing men, of applying the manure upon the surface of ploughed land without any attempt to incorporate it with the soil, although I think there is not that loss by the escape of gases, or by evaporation, that is generally supposed, and unquestionably the effect of this practice simply as a mulch is very beneficial. I hope the circular issued last spring, proposing an experiment in the application of manure, will be promptly responded to by practical men in all parts of the State. People may theorize as much as they please, but after all, it is by experiment alone, that we can arrive at definite and reliable conclusions.

In regard to top dressing grass land, I think its importance cannot be too strongly recommended to the attention of the farmers of this State. In my opinion more clear profit is derived from manure applied in this way, than by any other application of it.

Hay is and will be the staple crop of Maine. Upon this, her farmers are mainly dependant for means to enrich their soil and to replenish their purses. It is moreover raised and secured with much less labor than any other crop. I very much doubt whether an acre of fertile soil in Maine can be made to return so much clear *profit* with any other crop, and if so, the exceptions are few. I reason therefore, that such application of manure, as will most benefit the hay crop, is the most profitable for the farmer to adopt. Allen in his American Farm Book says, "if land produces at the rate of two tons per acre, the salts are taken out of it to the amount of upwards of 300 lbs. per annum. No soils but such as are periodically flooded with enriching waters, can long suffer such a drain with impunity. They must be renewed with the proper manures or barrenness will ensue." He recommends ashes, lime, bone dust and gypsum, as being essential to maintain fertility. And to ensure the

greatest product, animal or vegetable manure must also be added. He continues, "the proper manner of applying manure is by mixing in a compost and scattering it over the surface, where the grass is just commencing a vigorous growth in spring, or simultaneously with the first rains after mowing. The growing vegetation soon buries the manure under its thick foliage, and the refreshing showers wash its soluble portions into the roots; and even the gases that would otherwise escape, are immediately absorbed by the dense leaves and stalks, which everywhere surround it. When scattered broadcast, under such circumstances, the loss of manure is trifling, even in a state of active decomposition."

I knew a worn out field renovated and brought to a high state of fertility by applying long manure from the barn cellar, to the surface of grass land in the winter season, spreading it on the snow. I think had the owner composted his manure with other material, and allowed it to decompose before applying it, he would have derived still more benefit from it.

It is true most farmers after paying proper attention to manuring their corn and root crops, have but little left for top dressing grass land. But is it not a question worthy of careful consideration, whether it is not better to cultivate less breadth of hoed crops, and turn our attention more exclusively to the raising of hay?

A compost formed of barn manure, muck or soil from the road side, salt and lime, gypsum, wood ashes, old forest leaves and vegetable matter of any kind, will be found an excellent article for top dressing grass land, and will richly repay the farmer for all his labor in preparing and applying it.

Besides compost and barn manure, there are various mineral and other substances, which may be resorted to, as a top dressing, by almost all farmers to a greater or less extent. Among these I would name gypsum or plaster of Paris, which on some soils produces a very beneficial effect, and for such, is a very cheap manure.

Common salt frequently produces wonderful effects, particularly when applied on localities at a distance from the sea shore. It has been comparatively but little used in this country as a manure, although the result has almost invariably proved it beneficial whenever it has been tried. Prof. Johnston in his Appendix to his Lectures on Agricultural Chemistry, gives the results of experiments

made with several top dressings on grass land, in almost all of which, salt proved highly beneficial. In his remarks on one experiment he says, "the reader will be struck with the extraordinary increase caused by the addition of common salt." In this case three bushels was applied to one half acre, and gave an increase of 1000 lbs. of hay.

In conclusion I would recommend—whatever the crop, or whatever the manure, that the dressing be applied at or near the surface. Nature always manures in this way and we do well to profit by her teachings.

Sheep Husbandry.

BY WARREN PERCIVAL.

I enter upon the subject assigned me with extreme reluctance, notwithstanding its interest to me; for I feel utterly unable to do it justice. I am aware that a large portion of the agricultural community are searching for knowledge upon this branch of husbandry, and many have preceded me; consequently the very few original ideas I may present will be of but little worth to the reader. I say original, for I do not desire to use borrowed ideas or expressions, as I believe man's own practical experience is, generally, a better guide than his neighbor's theory.

I believe no one controverts the fact, that in nearly every locality, no other farm stock pays so large a per cent upon the capital invested as sheep. This being the fact, the question arises, what breed or breeds are best adapted to our climate in Maine, and will remunerate us best for the food consumed, and the care bestowed upon them. It may not be out of place here to define some of the characteristics of the various kinds of sheep.

The Spanish Merino is a small sized, compact sheep, completely covered with wool of a fine grade, fleeces varying from three to ten pounds. The Silesian are about same size, not quite so woolly, fleeces from two to six pounds, extremely fine. Great care is requisite to raise the lambs from these sheep in cold weather, for they require extra feed to yield milk enough to insure rapid growth and early maturity of their young; while the French Merinos are

somewhat larger in size, less compact in form, yielding larger fleeces but of coarser fiber, usually better milkers, rear their young with less care, and come to maturity earlier than other Merinos.

The South Downs are a distinct race, noted more particularly for their mutton. They produce a medium grade of wool, ranging from three to six pounds, and are excellent mothers, quite sure to raise their lambs which come to maturity rapidly and are ready for the butcher much sooner than the Merinos. The long woolled sheep are very dissimilar to either of those I have named, being of larger size, bearing coarse, long wool, clean legs and faces except the Cotswolds, which usually have wool upon their foreheads. I think these sheep, with the same amount and kind of food, will grow about the same weight, and will raise their lambs as well and as early, the one as the other, and nearly the same quantity and quality of wool per head, viz: from four to eight pounds.

I think every man should be governed in his selection by his locality. If he prefers to rear sheep for their wool, irrespective of their lambs for the butcher, I am of the opinion that the fine woolled races will yield more for the food consumed than any others, but if early large lambs are desirable, the long woolled are unquestionably preferable, or if we desire both or wool of a medium grade, a cross of the Merinos with the long woolled, will produce satisfactory results, and will pay a larger profit to the producer than any distinct breed *aside from sales of fancy sheep, at fancy prices, to fancy breeders*, which of course must be pure blooded of some kind. I have more desirable points in some of my grade sheep than in any of my pure blooded. I prefer to cross a fine woolled buck upon long woolled ewes, as in this case the lambs are small, and the long woolled sheep being great milkers and good mothers, they receive nourishment enough to insure rapid growth and early maturity; and in a cross of a long woolled buck upon a fine woolled ewes, *vice versa*. I know quite well that some celebrated writers disagree with me and contend that scarcely ever is the cross what we desire, but is marked decidedly one way or the other; true we do not in all cases get a perfect cross, but in a majority of cases I have been gratified with the result. I admit and even advise that the men, who possess intellectual and pecuniary ability, should confine themselves to some

distinct variety for the more careless farmers to procure the crosses with.

I think also that every man before he makes up his flock, should first decide what number he wishes to keep, for I am decidedly of the opinion that a much larger number of fine woolled sheep will be healthy and thrive together, than of the coarse woolled ones. As to the food consumed, it is a law of nature, that animals generally require nourishment according to their size, varying somewhat with their age. Some sheep repay us mostly in wool, some mostly in lambs, some in each alike. It is also one of nature's laws, that what matures early decays early, consequently a long woolled lamb which will mature in one half of the time that a fine woolled one will, will be valuable but half so long to produce wool and lambs. As to the time, or age, to dispose of sheep for mutton, I believe, as a general rule, when breeding ewes become extremely fat, no matter at what age, they should be slaughtered, unless they are some very *superior* breeders and their progeny are very desirable.

There are various opinions as to what time lambs should come. My preference is, not before the 15th of April, nor after the 15th of May, for many reasons. If before April 15th, the sheep require better feed in early winter, and will produce less wool by one pound. Such lambs demand constant care and often die. Those that live are ready for market or to take from their mother but little earlier. If after May 15th, there is usually fresh grass feed, which causes a large flow of milk, frequently more than the lamb can take, the sheep's bag is injured and the lamb stinted in its growth.

At the time which I prefer, sheep are or ought to be about the barn, instead of ranging "over hill and dale," and can be cared for with but little trouble, and I think if every man would carefully figure up his *shingle* he would arrive at the same conclusion which I have.

All buck lambs not wanted for use should be castrated at from one hour to one week old, and all lambs be weaned by the 15th of August. The farmer should first select the best to keep, and the butcher may have the balance with the old fat ewes, and although he may offer tempting prices for the first choice, still the farmer should be inflexible. No man should allow his ewes to have lambs until they are two years old, at which time they will have arrived

at maturity and will produce more wool and of a better quality, their young will in all respects be preferable to those produced earlier in life. Proper fall and winter management I consider of vast importance. Many sadly neglect their flocks late in the fall and early in winter, evidently thinking it economy to keep their sheep grazing as long as the ground is bare, and even after snow covers the ground, feed the poorest of hay or straw without grain until the wool ceases to grow, and poor old *nanny* nearly bleats her life away, and then wonder why nearly all the lambs die and the fleeces are so light. My theory and practice is, as soon as the ground is frozen hard and the grass has lost its sweetness, they should be taken to their winter quarters and fed upon good hay and grain, and all flocks thus cared for will present a wide contrast to those otherwise treated. No animal upon the farm is more susceptible to kind treatment than the sheep, and none more fond of variety in food, and frequently if left to their natural impulses, will seek variety for medicinal virtues.

I am aware that the ideas which I have presented will be considered erroneous by some, they are my own, nevertheless, and will be so until I get better ones, and my hope is, that they may stir up some one more competent to give our farmers better ones.

In the early part of the current year the Secretary received a letter from Hon. J. B. Brown, of Portland, then at Genoa, (Sardinia,) in which, after alluding to the deep interest with which during his travels he had noticed the great attention paid to agriculture in Europe, he goes on to say, "I have been led to contrast our loose way of farming with theirs, and ask myself what we in Maine are doing to improve our culture, to increase our products, and at the same time to lessen the expense, for after all that is the desirable aim I have long been impressed that a proper system of underdraining, with deep tillage or subsoil plowing, is very desirable, and not well understood. I therefore propose to put at the disposal of the Board of Agriculture of Maine, the sum of one hundred dollars, to be applied for the best Essay on those subjects, as applicable to agriculture in Maine."

Accordingly an offer was made and published in the Schedule of Premiums of the Maine State Agricultural Society for the year 1860, couched in the following terms:

"By the liberality of Hon. J. B. Brown, of Portland, the sum of one hundred dollars has been placed at the disposal of the State Board of Agriculture, to be awarded for an Essay on *Underdraining and Deep or Subsoil Plowing*, as applied to agriculture in Maine; and this sum is hereby offered for the best Essay on these subjects.

Manuscripts in competition for the above prize may be sent to the Secretary of the Board, S. L. Goodale, Saco, until the first of December next. They must be plainly written, on one side of the paper only; must be inscribed with a motto, and accompanied with a sealed envelope having the same motto upon it, and containing the name and address of the author.

Initials, or any other means than the above, of ascertaining the authorship, must not be used.

The prize will not be awarded to an Essay deemed unsatisfactory, whether there be competition or not."

Publicity was also given to the offer, through the Maine Farmer and other newspapers.

It is a fact more remarkable than creditable, that so liberal an offer drew forth but a single Essay,—this however, was deemed satisfactory by the awarding committee, S. F. PERLEY, President of the Board of Agriculture, and J. F. ANDERSON, President of the Maine State Agricultural Society, (Mr. BROWN, who had been named chairman during his absence, having declined to act,) and they awarded to it the premium offered.

This Essay is here published.

PRIZE ESSAY,

ON

UNDERDRAINING AND DEEP TILLAGE.

BY GEORGE L. GOODALE, SACO.

Among the influences which have conspired to render the agriculture of England superior to that of other countries, drainage occupies a prominent position. By the simple process of underdraining, much of her heavy and wet soil has been rendered lighter and warmer, more easily tilled and far more productive. The change has been so marked, that the acute M. Lavergne has, not inaptly, said of it: "It is as if the Island were once more rising out of the sea." At the instance of the Royal Agricultural Society, the English government has encouraged draining by loaning capital to small farmers, feeling assured that the money would be profitably expended. Such opinions, then, do the highest agricultural authorities in the world entertain on the subject of underdraining. As a result of this outlay, in connection with the improvements, farms once hardly able to yield enough to pay a small rent, are now paying higher rents and rendering rich and ample returns to the occupant. Thus has the whole appearance of the country been changed to one of great prosperity. In fact, this great luxuriance and evenness of crops, on soil naturally poor, strikes forcibly the observant visitor from France or America; and the reports carried back by such travellers have done much to stimulate progress in this direction in our own country.

It is proposed in the following essay to examine this subject of underdraining, inquiring:

First. What lands would be improved by draining?

Second. What lands may be profitably underdrained?

Third. The benefits to be expected from underdraining and deep tillage?

Fourth. The best methods of draining?

It is deemed hardly necessary to say that all swamps and bogs

would be benefited by the removal of the surplus water which they contain. The fact is self-evident and we need not enter upon any argument to prove it. There are undoubtedly large tracts of land in our State which are exceedingly rich in vegetable matter and cannot be developed without draining. But as these may, in most cases, be effectually and cheaply drained by open ditches, it is not proposed to dwell upon this part of the subject, but to pass to another portion less understood by farmers generally.

The writer is not of those who aver that drainage would benefit all land which is capable of being plowed to advantage. When a soil is underlaid by a porous subsoil, nature has already accomplished the work of draining better than it can be done by artificial means. It is a waste of money to underdrain such land, just as it would be to burn lamp oil to see to plow by. But all lands of ordinary fertility, naturally, which have a subsoil retentive of water, will most certainly be benefitted by draining. The subsoil may be clay, hard-pan or anything else; it makes little difference what it is, so long as it serves to keep the superfluous water from easily passing off. The results of such obstruction are readily recognized. The land becomes either boggy, permitting the growth of only such plants as peat moss and the more succulent aquatics; or it is rendered wet and fit only for the sour and rough grasses (Carices); or it causes an accumulation of water at a certain depth beneath the surface, which is injurious to vegetation and fatal to profitable culture. The last effect is the most disastrous, for while the farmer might never think of raising anything but a crop of cranberries upon land so wet as to allow peat moss to grow, he often sees no reason for not cultivating soil dry at the surface, but which conceals a retentive subsoil and yields but a miserable return. His failure to raise fair crops upon such land having stagnant water below the surface, he may often attribute to a lack of manure. But fertilizers on such land are little better than thrown away. A very simple test, and one easily applied, to decide whether lands need draining or not, is one given in an article on this subject in the report of the Secretary of the Board of Agriculture for 1856. *Let a hole be dug in the soil to the depth of three feet, and if water remains in it at any time for three days continuously, it needs draining.* Sloping grounds form no exception to this rule. Those which at

first sight would seem to be drained sufficiently by their natural descent, are often so saturated as to need draining quite as much as that which is more level. Lands saturated in consequence of springs which constantly yield water, also need draining.

It does not follow that all lands, which would be improved by draining, would yield a profit in consequence of its being done. This matter of profit in draining depends upon various considerations. First the character of the soil itself. There is some land which will not pay for fencing nor for clearing. The elements requisite to fertility may be wanting or so deficient as to render the ground unproductive. Of course such land would not pay to drain.

Again the location of the land might be such, that although the improvement would quadruple its productiveness, it might still be an unprofitable operation. This would be the case if inaccessible—or if in a district where as good land as this would be, after being thus improved, could be bought for less than the cost of draining. What we want to know, is whether the improvement will pay a good profit; or how much would the land be worth after draining? Would it be greater than the united value of the land before draining and the cost of the work itself? Plainly, if land, the market value of which is now only 10 or 20 dollars per acre, could be improved by draining, at a cost of 30 dollars per acre, so that its value would be increased to $100 per acre, no one would fail to recognize the gain. And this is mainly dependent upon the character of the land and its situation, so that land which it would pay to drain in some situations, would not be profitable to drain in others. Let the same rule be observed in this as in clearing land, rocky land, for instance. Can I make enough more from this farm after I clear it of rocks and stumps to pay for the work of clearing? The farmer knows the gain of a cleared field over one which is filled with stumps and stones; he knows the value of the land now, and he can decide about the work of clearing. After we have shown the benefits to be gained from draining and its cost, the farmer can apply the same rule to an analogous case.

Having noticed briefly the character of the soils which will be benefited by drainage, and indicated such as may be operated on with profit, we now come to the advantages to be derived from the operation.

The first and most important benefit is that it warms the soil; and this it does in several ways. It permits the stagnant water in the soil to pass through it, and allows the warm rains of summer to go down, carrying warmth in their course. This warmth upon undrained soil is unavailable because it escapes into the air instead of being retained in the soil. Water is so poor a conductor of heat that it is nearly impossible to make heat pass downwards in it. This can be easily proved by the simple experiment of boiling, or trying to boil, a kettle of water by heat applied at the top. A few inches might receive some warmth, but the effect of the heat would not be felt much lower, or to any great degree. The same principle operates to prevent the subsoil in saturated ground from receiving and holding the heat falling on the surface. The heat will not pass downward in the water filling the soil, but the warmer portions of water remain on the top and give off their heat to the air. This is of course the same, whether the heat at the surface comes from warm rains in summer, or from the sun; the subsoil in land containing superfluous water will not be warmed by heat at the surface of the ground. But when the surplus water is withdrawn by means of a drain, the water at the surface, falling by its own weight, takes the place occupied by the lower stratum before, and, although it may be but a moment in passing through the soil, it gives up its heat to it. Now the heat in the warm rains in summer can by this means, be readily saved to the soil on which they fall, and the heat given by the sun's rays may be retained as a gain instead of being wholly lost. That such heat at the surface may be an injury, very few would be willing to admit, at first sight, unless we confined such injury to drought and baking of land. But we desire to make this statement which we shall find to be correct, that heat given to the surface of undrained land, in fact produces cold. This seeming paradox is accounted for by the fact that evaporation produces, as a primary result, cold; and evaporation is hastened by heat. Thus in the case of a vessel of water on a stove, just as much heat is taken from the vessel as is required to change the water to vapor. It is also seen in the method employed in the warm months, to cool water. A wet towel is wrapped around the pitcher, and by the evaporation of the moisture in the cloth, sufficient heat is taken from the pitcher to cool the water several degrees. This principle that evaporation

is a cooling process, has been used by Providence to minister to our comfort in the summer time. By the evaporation of the moisture of perspiration on our foreheads, a refreshing coolness is given, which otherwise could not have been obtained, except by a reduction of the temperature around us. A more convincing proof of the truth can be obtained by personal experiment. Let one stand with damp clothes in a draft of air, and the chilliness immediately consequent upon the exposure is proof positive. Now the same holds true of the water at the surface of undrained land. By the evaporation of the moisture which cannot be disposed of in any other way, the ground is cooled by just as many degrees as are required to change water from its liquid to its aeriform state. Of course but rude guesses can be made in relation to the actual amount lost by this means, but the best authorities declare that the diminution amounts to at least 9° or 10° Fahrenheit. And this number of degrees of heat could be saved to the land by the avoidance of evaporation. Draining does this by taking away the superfluous water and allowing only a due quantity of moisture to remain in the soil. Thus as we have seen, the soil, by draining, gains warmth both in a positive and negative manner, *positively*, by bringing surface heat where it can be retained and used; negatively, by preventing loss of heat by diminishing the evaporation.

Next, I mention the advantage gained by the farmer in being enabled to work the soil earlier in the spring, and much sooner after heavy rains, at any season, than otherwise could be the case. As we have just seen, draining keeps on hand the requisite amount of water in the soil, and no more than the right amount. So that when the melting of the snow in spring has left a superabundance of water on the surface, the underdrains carry it off readily. And whenever in spring, summer or autumn, after a long storm, the drenched soil is rendered heavy by the great amount of water contained in it, it is relieved of this surplus moisture by the drains; while without them the ground would be cooling from evaporation of the surface water and much warmth would be wasted; with them the ground is left moist but not soaked—it is soon ready to work. This on clays and clayey loams, is of great account, as from their adhesive nature, they require to be worked at just the right time in spring because they otherwise become clodded and baked. But, by

draining, they are freed of the surplus moisture early and easily, and hence much time is gained for work, which without, would be either ill-done or neglected. No doubt exists on this point, for experience has abundantly proved that at least two weeks, (and some good farmers say three or four weeks) are thus gained by draining for spring work on such soils as require drainage. This is certainly no slight consideration in a latitude, where every day of the growing season is of great value to the plants. The spring work of manuring can be done at an earlier period than without draining; and early plowing, instead of rendering the soil harder than before, can be done more advantageously at an early period—in short, all spring work can be more easily performed, and in a better manner. Thus, by these two benefits conferred by underdraining, we get the equivalent of a longer season and a warmer latitude. Now a certain degree of heat is requisite to the full development of any plant—without such temperature, vegetation becomes sluggish and inactive. Farmers, everywhere, acknowledge this truth, and often when asked account for a poor or scanty crop by declaring that the land on which it was raised was "cold." Just here is the difference between the vegetation of the tropics and that of the extreme northern parallels of our temperate zone. In the one, the plants attain a majesty of stature which inspires awe in the beholder as he sees the ferns, canes and palms of the tropics, while in the other a stunted, dwarfed growth affords but a scanty vegetation confined to the cone-bearing shrubs and trees, and the flowerless plants, mosses and lichens. Of course there are all grades and degrees of difference between these two extremes—tropic and frigid, all dependent on latitude, or on elevation. Since then vegetation varies according to warmth, it follows that if our soils can be made warmer we virtually have a longer season, longer by some weeks each year. Can the farmers of our State who watch anxiously every autumn, the approach of frost, fearing that it may come before the corn, now in the milk, will be hardened and glazed—can these farmers afford to lose the opportunity afforded by underdraining to hasten vegetation and make sure of good crops?

Another advantage to be gained from draining is the deepening of the soil, by developing the latent capabilities of the subsoil. It does this by allowing the access of air to produce decomposition

and thus change the nature of the dead subsoil to the quality or nearly the quality of the upper soil. All disintegration and pulverization of rocks is caused by the combined action of air and water. By these two fluids, the rocks of former geologic periods have been changed to fragments and dust. And this, together with the deposits of leaves and other decaying organic substances, forms our soil. The comminuting process is still going on wherever air and water can have access, thus forming finer and consequently richer soil. Without air this action ceases, and soils to which air and water can obtain no access remain unchanged. Air alone cannot perform the work; and water unaided is inadequate to the task. Therefore soil, which is saturated with water and consequently contains no air, must remain in the same undivided state; while in soil well underdrained the water does not fill all the little crevices between the particles of earth, but air is allowed to come in and act. Then the work commences. The larger particles become finer, and the smaller ones finer still. Thus the soil is deepened by the work, more soil is rendered fit for use. But this change is not rapid; on the contrary, it is very gradual in its operation, and the benefit arising from it is a constantly increasing one. Seeds germinate more readily and grow more luxuriantly than in soil where the particles are crude and coarse. And, since draining aids in deepening the soil, roots will descend farther and take better hold on the ground and grow more vigorously and luxuriantly. A portion of the farmer's crops consists of plants whose roots are ultimately used for food for other plants, as clover. These, in order to grow and develope fully, need depth of soil. It is hardly credible how deeply roots will go in quest of food in some soils. Mangold wurzel and white turnips have grown three and one half feet long, and parsnips have been grown in some instances to the surprising depth of thirteen feet. The roots of lucerne have been traced to even a greater depth. Not only do roots need depth of soil, but they require more than this, they need a porous soil. All roots require air. This they cannot have when water excludes it from the soil as we have just seen; but free access of air is permitted by draining. Thus they get air which they need as much as they need water, since plants are not like fishes, fitted to exist under water. In fact, the aquatic flowering plants are confined to a few genera like pond weed and its

kindred. They are so few as to be almost exceptional and are worthless for agricultural purposes, so that, with little liberty of language, plants may be said to breathe, as we do. Hence as this is a part of their life, one of the conditions necessary to their healthy growth if not their existence, those which have a free access of air are the most thrifty and the strongest.

By access of air, the decomposition of the animal and vegetable matter in the soil is hastened. This, of course, assists vegetation as it furnishes nutriment for the plant on the very spot where it is needed. Thus the fertility of the soil is greatly increased. With stagnant water in the soil, however, none of these benefits can be be obtained—the soil will remain shallow and coarse, and the roots will not sink deeply into it, as they need extensive feeding ground; and more than this, the manure on the surface will be of comparatively little advantage to the soil below—since, if it did sink into it, it would not be decomposed.

Water is a solvent for the impurities of the air. Ammonia, the active principle in nearly all manures, a prominent constituent of all fertilizers, exists in appreciable quantity in the air. This is especially true of the atmosphere after a drought. Water will dissolve seven hundred times its bulk of this gas, and even at common temperature and under usual pressure, will take up a large amount.

Rain water containing ammonia falls to the ground, and passing through the soil to the drain, is relieved of its impurity which, as a fertilizer, remains in the soil. The soil has acted like an absorbant filter, allowing only the pure water to pass off. Any one who has tasted the water falling from the mouth of a deep underdrain, must have noticed the purity of the water and its agreeable softness. This is wholly due to the absorption of these impurities which are valuable manure. Thus the vapors from bogs and swamps and undrained soil in general, are all retained and used by land which has been properly drained.

I notice as another benefit that crops grown on drained soil are of improved quality. The roots are larger, fuller, stronger—so that the weight and value of the crop is much increased. This has just been incidentally alluded to under a preceding head where we spoke of the increased depth of the soil. Draining prevents the freezing out of roots in the winter. That which we call the "heaving" of

ground by frost is merely the pressure of the surface, by its expansion, upon the substratum which will not yield. The ground was loosened by plowing only to the depth of eight or ten inches, and *this* chiefly is affected by the frost. The crystals of ice, each carrying up a little of the soil, lift up the roots with them to become exposed to the action of the weather, and in a short time the plants suffer seriously. By underdraining, much of this injury is avoided. Less water being contained in it, there is less heaving of the drained soil, and, as a necessary result, there is less of winter killing. The united testimony of those who have thoroughly underdrained their land seems to be, that little or no freezing out takes place upon it. Hence, by a more extensive use of draining in our State, we might have a more extensive cultivation of winter grain.

We do not propose to dwell on the more obvious advantages arising from underdraining. A few of them only will be alluded to.

By it, we avoid open ditches, which are a waste of land on any farm. The farmer cannot plow close to such drains, much land is unused besides that occupied by the drains themselves. They are very inconvenient, no matter how skilfully contrived and arranged so as to interfere as little as possible with teaming. They are always in the way, they take too much room. Open drains also waste soil by carrying off the more valuable and finer portions by washing. Thus they involve an expense of money, time and land which are not balanced by the good done. All the good that open drains do, underdraining accomplishes more easily and far better. Open drains also must be frequently repaired, and the obstructions to which they are liable removed. Underdraining when once carefully and securely done, needs no expensive repairs. Draining also obviates the necessity of plowing lands into beds. This custom of raising land in ridges by plowing, has grown out of the necessity of avoiding an excess of water, but it fails in great measure to accomplish the object aimed at, while draining does it thoroughly and effectually, and the land may safely be left even and convenient to work. Teams also can pass easily over well drained land under circumstances which would prevent the use of the same teams on soil saturated with water. More than this, the loaded teams can pass without any injury to the land itself, while on undrained land the soil would have been pressed down and rendered more solid than before.

Passing over the well-known facts, that drained land is always lighter and easier to work at any season, and the superiority of such land for pasturage, owing to the better quality of the forage and the fact that the feet of cattle do not trample it hard as they do wet land, that all operations needful to be done upon the land may be more easily done, that a given amount of manure will do more service upon drained land than upon undrained; omitting to enlarge these and other benefits, I come now to speak of *underdraining as a valuable security against drought.*

This is one of the most serious evils against which the New England farmer has to contend, and every assistance which he can gain should be welcomed and improved. Our seasons are very variable, one year being what we call a "dry summer," the next may be a "wet" season, and the succeeding one may be a "drought." Weeks, and sometimes months, may pass with little rain, and during all this time the crops are growing but slowly, if, indeed, vegetation is not entirely checked. It is certainly of the highest interest to the farmer to guard in every possible way against the effects of drought.

At first sight, it might appear as absurd to drain land in order to guard against drought, as it would be to irrigate land in order to make it drier; but such is the effect, as experience has fully demonstrated. *The fact being established* by the concurrent testmony of all who have underdrained land, it matters comparatively little whether we know the why and wherefore of its operation or not. But a little reflection will enable us to learn much relating to the way in which it is effected. In undrained soils, vegetation is feeble, particularly in its early stages, the very time when a strong and healthy start should be gained. The roots can go no farther than to the stagnant water in the soil, whether it be three inches or ten inches. When they reach it, they cannot extend into it, for the soil containing water of drainage admits of no access of air. In such ground the plant is unable to obtain that aliment which it needs, and therefore extends its roots in a lateral direction, branching out in search of a more congenial soil, and this it can do but feebly and ineffectually. The plant sickens and cannot grow vigorously without deeper roots. If a drought follows such a state of things, they are unable to penetrate more deeply and thus obtain a supply

of moisture, as they readily would do in well drained soils, and the whole plant is dwarfed in its growth; perhaps its growth ceases entirely. If, at the early Spring, the roots had been allowed by a fit soil to strike deeply downward, then at the time of drought, it would have had no difficulty in obtaining the moisture which is always present at a greater depth. Thus underdraining prevents the serious effects of drought, by strengthening the plant for the emergency.

The deepening of the soil itself, caused by drainage, is another way in which this is produced. The increased porosity of the soil which has been alluded to assists in this respect, because finely divided particles of soil retain the moisture which a coarser one would not. Water is held by attraction between minute particles of soil when it would speedily escape from a less fine material. Since underdraining comminutes the subsoil and the surface soil by the admission of air as we have seen, such land will be more retentive of its moisture than than that which is not underdrained. Draining also assists, very materially, in times of drought, by rendering the soil more capable of attracting and absorbing moisture from the dews of night. Upon well drained land dew is absorbed and retained, when upon undrained soil it would not be. By these means the farmer can guard against drought so that it is only fair to say, that to some extent, he conquers it. One of our farmers, Mr. Nourse of Orrington, who has underdrained a large portion of his farm, stated (as quoted by Mr. French in his "Farm Drainage, p. 285,") "during the drought of 1854, there was at all times sufficient dampness apparent on scraping the surface of the ground with the foot in passing, and a crop of beans was planted and gathered therefrom, without as much rain as will usually fall in a shower of fifteen minutes' duration, while vegetation on the next field was parching for lack of moisture." Thus by underdraining can we not only gain several weeks in our working season, but we also, besides the other advantages mentioned before, prevent in a great measure, this fearful calamity.

We come now to treat of the construction of drains—the materials used, their depth, direction and distance asunder. Having, perhaps, already extended this paper to an objectionable length, our remarks will be brief and concise, yet as comprehensive as possible.

Underdrains are constructed in various ways, in all of which excavation is the principal cost. The great object in economical drainage, is to lessen the expense, and at the same time obtain a good and safe conduit; but this should never be done at the sacrifice of proper depth. What is proper depth is a question which has been long and earnestly contested. Volumes have been written by the advocates of deep and shallow drains, until the subject has been exhausted. In brief, it may be said that the result of much investigation and experience is, that four feet is the proper depth in most cases. Three and a half, or even three feet, may be admissible in stiff clays, but the drains have to be proportionably nearer together, while in soils of a loose texture they may be made deeper and farther asunder. In stiff clays, they should be not more than two or three rods apart, and if nearer, all the better. In soils of more open texture, three or four rods serve a good purpose. In every case, it must be borne in mind that we make a permanent investment, when we make a drain of the right character. It is not merely work for one year, or one crop, that we enter upon when we excavate the soil and place in it a good drain. On the other hand, it is for a constantly increasing advantage to our land, and must not be considered a temporary affair. But shallow drains and half made drains *are* temporary, and it is only deep draining, skilfully executed, that lasts and satisfactorily performs its work. Let this be considered by every farmer, before he lays out his plans for his drains: let him be far-sighted enough to lay his drains of sufficient depth, and to do the work *well*. If the undertaking be an extensive one, he will do well to have the services of a draining engineer to take the levels, to lay the plans and get the work well started. The economy of so doing can not be doubted. The writer has known of some ludicrous mistakes from lack of knowing the true levels and having a good plan beforehand. In one where the drains were commenced, and some progress was made before the levels were taken, it was afterwards found that the descent was in a direction opposite to what the owner supposed, judging by his eye. Drains can be laid where the descent is not more than four inches in a hundred feet, or even less; but of course such require great care to secure accurate grading.

Large portions of our State are seriously encumbered with stones

on or near the surface. In fact, such fields must be thoroughly cleared from them before they can be easily cultivated. When this is the case, stones may be employed to advantage, although they require a much wider trench than tiles, of which we shall soon speak. Stones should be so laid as to form as perfect a conduit as may be.

Fig. 1.

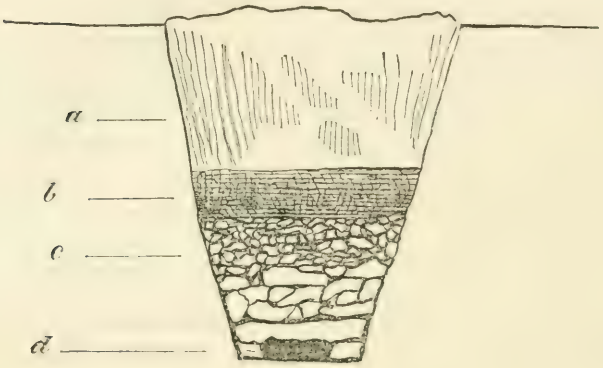
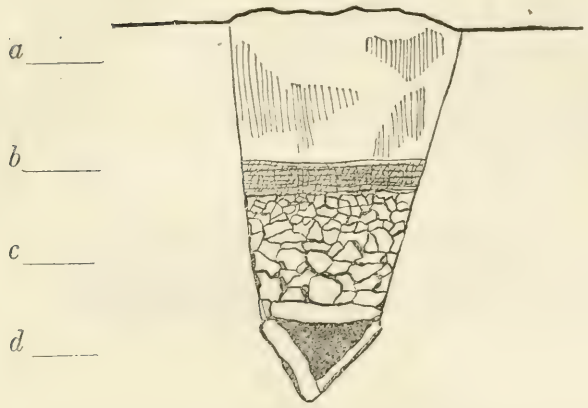


Fig. 2.

Fig. 3.



EXPLANATION OF THE FIGURES 1, 2 AND 3.

a. a. a.—Surface and subsoil.

b. b. b.—Solid soil or shavings.

c. c. c.—Covering stones.

d. d. d.—Conduits.

The stone conduit should be covered in with small stones to the depth of a foot or more. The top layer of small stones should be at least twenty inches or two feet below the surface of the soil. The earth first thrown in upon the small stones should be very firmly trodden down before the drains are filled, to prevent any washing in of soil so as to obstruct the conduit. Sometimes the same result is effected by shavings, but the pressure by the trodden soil above will save the trouble and expense of the substitute. Stone drains cost more for excavation than tile drains, because they require to be wider; but otherwise, when well laid, may be considered good and economical. They will last indefinitely, and, if carefully laid, will not easily become obstructed.

The best mode of draining is by tile. These are merely different forms of conduits made of brick clay burnt hard. They are now made in this State, and with increased demand, manufacturers will multiply in number and the price diminish. Two inch tile now cost in Portland about $14 or $15 per 1000. They can be afforded when there is a sufficient demand, for $10. This is a size suitable for minor drains, while main drains should be of a size commensurate with the amount of water to be conveyed in them.

The "pipe" or round tile is the best, horse shoe the worst, as it is more liable to break and to become obstructed. Sole tile is now in common use and is a good style. Pipe tile, with collars to fit on the joints, is the perfection of tiles, but collars have not yet been made to any extent here, and the round or sole tile. *if well laid*, will rarely get out of order.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 1. Cylinder or pipe tile.
" 2. Sections of pipe with collar.
" 3. Horse shoe tile.
" 4. Sole tile.

Particular care should be taken in laying them that all are on a level, or rather, that they have the proper slope, and one no more than another; and that the joints are covered with shavings or some material to keep out dirt. Birch bark is better than anything else for the purpose.

Planks, boards or even brush (bushes) may be used where neither stones nor tile can be procured; if brush be employed it should be covered with boards or slabs, and the earth next it be trodden firmly before filling in.

The direction of drains, whether in the line of steepest descent or laterally, has been much argued, but no doubt now exists that the

former is the best and *the only proper* method. It is now universally adopted by all scientific and well informed practical drainers, both in England and America.

The importance of deep culture is not sufficiently appreciated. In this way alone can land be properly prepared for horticultural operations. The soil of the flower garden, the fruit garden and the kitchen garden, requires thorough trenching or digging over with the spade to the depth of two or three, or better still, four feet deep. Many gardens, it is true, succeed tolerably well with less, but they yield little satisfaction compared with what would be derived from a deep and thorough pulverization of the soil. The grape vine whose roots wander far and wide in search of food, and the strawberry, whose roots appear to a superficial observer, to extend but a little way, form no exception, in fact the best horticulturist insist upon depth of soil for these, quite as much, if not more, than for any other plants.

But spade culture in a country where land is so cheap and labor so dear as in Maine, is out of the question, except on a limited scale and for special purposes. The farmer who has generally insufficient capital, and broad acres to go over, must enter upon the consideration of deep culture from another standpoint; its benefits being seen, he desires to know how he can avail himself of them. Attention has been drawn to the subject to some extent, and it is undoubtedly true that plowing in general is now considerably deeper than formerly, but in most instances it has been found that if much of the inert subsoil was at once brought to the surface, the crops suffer, rather than gain, unless a corresponding amount of manure is added to the soil, and this is usually beyond the ability of farmers to supply. In such cases, *subsoil plowing* is of the greatest value. This operation by loosening the substratum without bringing it to the surface, and without burying the more fertile soil, allows the roots to penetrate deeply in search of food and moisture. They thus grow with astonishing rapidity, and are more successful in resisting the attacks of drought. Subsoiling is all the more necessary in lands which have often been subjected to the action of the ordinary plow, because every time the latter passes through the soil, it renders more firm and impenetrable all that portion beneath it. The subsoil plow ought to be a common implement instead of being as now, so rare

that not one in ten, if one in a hundred, of the farmers of Maine ever saw one. But, in all soils retentive of water, *underdraining should precede subsoiling*, as, otherwise, the water soon settles down the whole into as compact a mass as before, and the benefits which might otherwise be derived from it are wholly lost. Thus we see that on all such soils underdraining *lies at the foundation of, and constitutes the first step towards an improved husbandry.*

While it is certain that *a surplus of water, stagnant in the soil*, is one of the greatest obstacles to productive culture, and so great that on retentive soils, underdraining is a first and fundamental step towards a high degree of improvement, it is equally true, that *water in motion*, over the surface of land, under due regulation, is one of the most active and effectual agencies in promoting growth, and it is one which in not a few instances might, at a moderate cost, be brought into service by our farmers.

I am therefore happy to be able to present, in this connection, an article on the

IRRIGATION OF LAND.

[Written for the Maine Agricultural Transactions.]

By Albert Moore, Esq., Salisbury, Conn.

Among the various methods which have been resorted to, to promote the growth of vegetation, the employment of water by what is termed irrigation, has been practiced from a very early period to the present time, and in nearly every country; but in those countries where agriculture has been carried to its highest perfection, irrigation has received the greatest attention, and in some countries it forms a very prominent feature in connection with the cultivation of the soil. With few exceptions, less attention has been given to this branch of farm improvement by the American farmer, and by our agricultural journals, than has been bestowed upon it by those in like positions in other countries. In Europe, irrigation is applied to a greater or less extent by the farmers in perhaps every country from the shores of the Mediterranean to near the Arctic circle, corresponding to a point more than one thousand miles north of the city of Quebec, on this continent, and in some countries, it is regarded of such importance, that water is bought and sold by cubic measure for this purpose; and in other sections, the alternate method is by law kept in force, for the use of the water of small streams, and none is allowed to be wasted.

Von Thaer, a distinguished writer, says, "irrigation is certainly

one of the most useful and important of all the operations that come within the province of the farmer." Sinclair says, "a productive water meadow is probably the true mark of perfection in the management of a farm." Pusey says, "a water meadow is the triumph of the agricultural art." Stearns speaks of irrigated meadows yielding over five tons of hay to the acre, and Liebeg speaks of from three to five perfect crops being obtained in a season from watered meadows. The benefits of irrigation are owing to the operation of several natural laws acting in combination. The tendency of water, for instance, whenever it comes in contact with the surface of the earth, is to settle immediately downward, and into the earth, in case it meets with no obstruction. Water also has the power of dissolving a variety of substances and retaining the same in a soluble state until it meets with some natural agent or artificial process capable of extracting the same. The waters of rains and melting snows, as they pass over the inclined surface of the earth, buoy up and carry along to the adjacent streams the finest and most minutely divided particles of soil, and which are the most fertile; and as it falls from the clouds, either as rain or snow, it absorbs fertility as it passes through the air. Indeed, in whatever position we find it, whether flowing in streams, or issuing from the recesses of the earth, it contains an amount of fertility, either in solution or suspension, or both. All soils possess the power of absorbing or retaining whatever fertile matter may be held in suspension or solution by water as it passes through the soil; and this fertility, too, is arrested and retained very near the surface, and within reach of the roots of those plants which are even the most shallow, like many of the grasses: and as it is to the grass crop to which irrigation is principally applied, the most valuable varieties not only require a great amount of moisture during the entire period of their growth, but sustain no injury from a large surplus of water, *when applied according to the rules of irrigation*, and where the water is even so abundant that the soil cannot absorb the whole, and a portion of it passes along over the inclined surface in a broad sheet an inch thick, surrounding the foot of each plant, it grows rapidly and luxuriantly: but when the water is applied only by night to the growing crop, and permitting the sun's rays and heated air to have full access to the moistened surface through the day, as is practiced in some parts

of Europe, we have the most perfect method of combining the effects of heat and moisture, and applying them to a crop which requires a very large amount of both, while at the same time, whatever fertility the water may contain, is in the best possible condition to be useful. It is placed all around and in direct contact with the roots for their immediate absorption and elaboration. The great success attending the practice of Alderman Mechi, of England, who reduces his manures to a fluid state, fully demonstrates the utility and importance of this method of supplying crops with their required nutriment or fertility.

From the great growth which grass attains under irrigation it may be inferred that water is a great natural fertilizer to the grass crop when properly applied, and that the usual quantity of moisture which this crop receives from rain, dews, &c., is much less, even in seasons of profuse and frequent rains, than is requisite to enable the crop to reach its full capacity. Hay to the amount of three or four tons per acre is often obtained simply by the aid of water, and while the grass attains a hight in some cases of four or five feet, a remarkably *thick growth* of the plants is always observable, which tends to render the stems of the plants small and fine, and more palatable to stock of all kinds. Indeed the spontaneous growth of grass plants induced by water is almost a phenomenon. Where white weed, Johnswort, &c., had nearly overrun a field to the exclusion almost of grass, it was found that after two or three years of watering, these noxious plants were exterminated by the very thick growth of the best variety of grasses, when no grass seeds had been sown. Mr. Flint in his "Treatise on grasses and forage crops," states that 1798 grass plants were found by actual count on a square foot of sod "from an irrigated meadow, while a square foot from the richest natural pasture, capable of fattening one large ox and three sheep to the acre," contained but 1000 plants, which would make a difference of over thirty millions of plants to the acre in favor of the irrigated land. A similar comparison in another instance showed a difference at the rate of thirty-seven millions of plants to the acre in favor of the watered portion, over that beyond where the water reached, the distance being only nine feet. Wherever irrigation has been properly applied in this country, especially on grass lands, its effects appear to be as remarkable as in foreign countries. Among

the premiums awarded within a few years past by the New York State Agricultural Society on grazing farms, it is found that irrigation was the principal means employed in effecting large yields of grass on both pasture and meadow lands. The premium for the best crop of grass awarded in 1860 was on grass grown by irrigation. The same year $20 was awarded to a gentleman for his system of irrigation, which consists mainly in directing small streams of water from their natural courses, principally by means of the plow on to quite poor soils, from which he obtained last year four tons and seven cwt. per acre, from twenty-five acres by two cuttings. Nearly similar results have been obtained in various parts of the country, the early and rapid growth of the grass often admitting of two crops of hay being obtained from the same field each year, and it is this early growth of vegetation induced by irrigation, which renders it important in those sections were the growing season is short.

The effect of water on pasture land is equal to that on meadows, and it will be generally noticed that stock of all kinds show a preference for the irrigated portions of the field. On some soils, irrigation may be continued while the stock have access to the field, as the surface of an irrigated field is usually less injured by the feet of cattle than when the land is naturally wet and soft. It frequently occurs that after a few years of watering, the soil becomes so compact that only slight injury will be done by cattle, but when the surface is liable to injury in this respect, the water should be withheld while cattle occupy the field, and in no case should water be allowed to flow over the surface while the field is occupied by sheep, (unless a short time before being slaughtered,) as the water tends greatly to induce foot rot. Profuse watering in early spring and even in winter, will render it less necessary in summer, and the effects will be observable through the entire season. The soils best adapted to irrigation are those which are dry enough either naturally, or by underdraining, to produce corn, wheat, rye, &c.

Muck and clay soils are not well adapted to summer irrigation. Upon common dry loam, fine sands and gravels, irrigation is usually most effective. An English writer says, "the finest water meadows on the Avon, where the richest herbage is found, have scarcely any soil at all, but are on a bed of gravel and pebbles, and these are

matted together by the roots of the grass." *In all locations where standing water in the soil prevents surface water from settling down through the soil to the depth of three feet or more, irrigation is not beneficial,* but in nearly all cases where grass lands naturally wet, have been reclaimed by underdrains, irrigation has been found to produce great results.

While it must be admitted that the localities where irrigation can be applied, especially by the natural gravitation of water, are but small portions of any country, yet those localities often occur, and more frequently than might be supposed. On the Blackstone river and its tributaries, in both Massachusetts and Rhode Island it has been long, and perhaps more extensively practiced, than in any other section of New England. In the interior of New York a land holder irrigates 125 acres, and it is also practiced in that and other States on parcels of land of various areas down to a single acre, and when it is considered that the waters of nearly all streams, from the largest to the smallest, are adapted to the purpose, whether they be what are termed hard or soft water, warm or cold, and that level lands are adapted to one method and sloping lands to another, and when it is also considered that all streams flow with a greater or less inclination or fall, and that their waters may be conducted off in channels for irrigation to a great distance upon a still less fall, it may be inferred that the locations are very numerous where it may be profitably and in many cases extensively applied. There are but few farms probably in the northern or eastern States but what have streams of a greater or less volume passing through them, and even the small streams which flow but a single month in spring are quite effective, when their waters can be spread over the adjacent surface as far as they will reach.

In all cases where the least doubt exists with regard to the practicability of conducting water to any field from a stream, the eye alone should never be relied upon to decide the matter. A mason's or carpenter's spirit level may be used to ascertain the practicability, but in locating and laying out the main ditch or canal, furrows, laterals, &c., the span or plumb level is preferable, which is easily made of two narrow strips of board and a cross piece, in the form of the capital letter A, the plumb line, being suspended from the apex, will show by marks on the cross piece (corresponding to inches and

parts) the rise or fall between the feet of the instrument, which should be eight feet three inches (half a rod) apart. With the aid of this instrument nearly all the elevations and depressions on the line of a contemplated ditch may be passed without making deep cuttings or high embankments, and the ditch will also have a regular grade when properly excavated, and the distance ascertained by counting the steps made by the instrument for summer watering when the crop is growing. The surface should in all cases have a sufficient inclination or slope to cause the water to *flow constantly* over it, allowing no water to stand on any portion of the watered field, and this rule must be strictly adhered to, for *stagnant water* will *destroy* vegetation. A perfect level for the main canal and laterals may be resorted to, when it is desired to reach a given point, or to embrace as much land as possible. Wherever the inclination of the field to be watered is sufficient to admit of the outlets to convey the water on to the surface being a little lower than the surface of the water in the main or lateral, this will cause a current in the canal though it be on a level. Yet it is always desirable to have a fall in both main and laterals—when it can be obtained, which should be by true grade the entire length, but sufficiently gradual to prevent the water from washing away the sides and bottom of the ditches. It is said that a furrow or channel four inches deep by six inches wide with perpendicular sides, and one inch fall to the rod, will discharge about sixty gallons of water per minute, but it is difficult to ascertain in advance the quantity of water required to irrigate a given space of ground, without regard, however, to the quantity which is constantly soaking into the soil. It is said that a sheet of water one inch deep, flowing over the entire surface, should be the medium aimed at. The earth taken from the ditches and furrows, especially on meadows, should be spread evenly over the surface or otherwise disposed of, as the mowing machine, horse rake, &c., will then pass them with less difficulty. In taking the water from large streams, the main canal should extend from the stream at a right angle for a few rods when practicable, and to effect this it is better to resort to an entire level for this distance, even where the declivity of surface does not require a level, and the canal may here be made proportionally wide or deep, to turn off the water when necessary; and to guard against injury from freshets, a

flume or water gate may be placed in the canal at the point where the highest water of the stream is known to reach, the lever of the gate being so adjusted as to extend some six or eight feet up stream from the gate, and attached to the head of an empty water-tight barrel, standing erect between three or four stakes well set into the bottom of the canal. The gate will then close as the water rises, and open by the weight of the barrel as the water falls, which will tend to prevent injury from sudden inundations from the stream by night or day. On some fields, ditches and drains are required to carry off the surplus water, and this in some cases may be conducted to lower elevations in the same or other fields for further irrigation, or to the original stream. The labor and expense which has been incurred in some cases to dispose of the surplus water when not wanted for further irrigation, has been in several instances avoided by letting on only a sufficient quantity for the field to absorb; this method has been practiced on some of the most productive watered meadows. In cases where the water is inclined to accumulate as it flows over the surface, small furrows are cut to conduct it to those places where it is less inclined to flow, and this is called *catch work*, but the most perfect method of distributing water over the surface is termed *bed work*, and consists, whenever the field is proper for it, of throwing the surface into long beds at right angles with the main canal which is to supply the field, and is effected by several plowings upon the same plow lands. Regular elevations and depressions will thus be formed, the water is conducted from the main in a furrow extending down on each ridge or elevation its entire length, and is made to flow out on to the surface from both sides of these furrows. As it accumulates in the dead furrows, catch work may be resorted to, to carry it to the ridges a little lower down. The canals, ditches, &c, when properly constructed, will probably remain for centuries, with slight repairs, in case the field is not plowed up. The repairs mainly consist in removing by the aid of the plow, &c, the fine sediment which has lodged in the bottom of the ditches. This has been found to be a valuable fertilizer for other fields and even for gardens. Herdsgrass or timothy, Kentucky blue grass, orchard grass, red top and several other varieties are adapted to irrigation; white clover and a fine variety of the red clover often spring up spontaneously, but it is said that Italian rye

grass grows the most rapidly, and yields immense crops by the aid of water, and Mr. Flint states that it will endure any amount of forcing by irrigation." A year should elapse after seeding before water is applied and the effect is usually slight the first year, but rapidly increases. During each season the channels and ditches should occasionally be looked to, and floating substances, which tend to obstruct the water, removed.

Several foreign writers (and even one who wrote 2000 years ago,) have given directions as to the management of water meadows, but the two brief and simple rules adopted in France while the crop is growing, are probably well adapted to this country, viz:

First. Water profusely in nights and cloudy days only.

Second. Keep the water constantly moving.

The effect in that country, under this method, has been pronounced wonderful. For three days and nights before cutting the crop, which should be done as soon as mature, the water should be entirely withheld, and let on immediately after the crop is removed, to induce a second crop either for hay or pasturage.

For summer irrigation, the water should be turned on at the commencement of the spring freshets, and be continued both night and day till the freshets entirely subside, the water of the streams becomes clear and the weather moderate. The night method may then be adopted, and the water wholly withheld when the grass ceases growing in autumn. Winter irrigation, it is said, tends to prevent the ground from freezing, or at least to the depth it otherwise would, and, unlike summer irrigation, is adapted to both level and sloping lands. It is applied to the former when the ground begins to freeze, and is withheld in spring when freezing ceases and the spring freshets subside. A thin sheet of ice is at first formed, which gradually increases and protects the ground under it. Prof. Davy found the earth beneath a sheet of ice, on a water meadow in England, to be fourteen degrees warmer than the atmosphere above. Chaptal, in referring to this circumstance, observes, "that every one must have noticed that when only a part of a meadow is covered with water during winter, the herbage on that part left dry is withered and nearly dead, while the rest retains its green hue, and continues to grow." The recipient of the premium for irrigation above alluded to, states that he considers irrigation in winter equal to that of sum-

mer. Another farmer in the same State even fills his ice house in winter, from the place where he cuts large crops of hay in June, and where his large herd of fattening cattle, by grazing upon the after crop, receive their finishing touches for the New York butcher. Under date of Aug. 22, 1858, he wrote thus: "I have, at this time about seventy head of stock cattle, sixty of which are nearly ripe for the butcher, and have cut about 100 tons of hay on forty acres." It may not be improper to observe that ten years before this gentleman's meadow land was the poorest part of his farm, and irrigation both by winter and summer, in connection with a few underdrains, is almost the sole means of rendering it thus productive, while at the same time the fine rich sediment which he annually takes from his irrigated ditches and ponds and applies to his other lands, he considers equal in value to the interest on $600, the cost of two permanent stone drains made entirely for irrigating purposes.

On steep hill sides where the water fails to entirely prevent the earth from freezing, there is danger of the water getting beneath the frozen ground and cutting deep gullies; in such locations due caution is necessary in conducting winter irrigation. The fertility which the soil receives during winter is probably adapted to every growing plant, and it also greatly tends to destroy the larvæ of numerous insects and worms which prey upon plants while growing; and while all vegetation otherwheres is suspended and the earth frozen to the rigidity of a rock, the watered field is alive, and to a great extent exempt from the rigors of winter, and is rapidly increasing in fertility, while its vegetation in spring is usually far in advance of other fields, which often require weeks of sunny days to expel the frost from beneath the surface and to give new vigor to the soil; and to have the grass of spring meet the forage of the past winter at an early day is of great importance to many farmers.

There is another method of applying water to land in winter, which is known as inundation or flooding. This is applicable to tracts of land which are adjacent to streams, and when an opportunity is presented to construct dams sufficient to cause the water to overflow and flood the adjoining land; the effect is somewhat similar to that of winter irrigation proper, and is alike applicable to the promotion of any crop adapted to the land. The water after the

spring freshet has subsided and has become clear, is withdrawn by gates placed in the dams for this purpose, and should be done when least agitated by wind. This method has been practiced in several localities in this country with good success, and in Holland this method is applied where it is said the largest crops and richest grasses in Europe are obtained. In most cases the surface water may be taken from the ponds in ditches, and carried a great distance on both sides of the streams, and extensive winter irrigation may be effected and fields reached which could not be irrigated in summer without flowing the lands above the dams, while the soil beneath these winter ponds may receive a portion of the soluble matter contained in the water above. Inundation is probably the most perfect method of obtaining the solid or suspended matter, most of which is highly fertile.

By an analysis of the waters of seventeen rivers, mostly in the northern section of this country, recently published, the average amount of solid matter is over six grains to the gallon, and Dr. Dana estimated the quantity of salts in solution, and of geine or humus (vegetable matters) which were borne seaward past Lowell in the Merrimac river in 1838, as reaching the enormous amount of 840,000 tons, enough to give a good dressing to 100,000 acres of land. To arrest and turn this vast amount of fertility, or a portion of it, from its downward course to the ocean where it is forever lost, and apply it to the subsistence of man, is one of the grand objects and results of these various methods of irrigation. It has been said that water greatly tends to the protection of nearly all farm crops from the effects of frosts, both early and late, wherever it can be resorted to by night application, whenever a frost is indicated, as is done on cranberry meadows. It has been stated that it tends to hasten and promote the growth of the corn crop when applied upon the appearance of the silk and tassel, and it will continue to grow rapidly through the remainder of the season by the aid of irrigation, and it is known that, up to that period the growth of this crop requires but a small amount of moisture, after which, a larger quantity is requisite for a while.

It is said by some farmers that the grass and hay of a watered field is less palatable to stock, and like that grown in shady places, is less nutritive than that grown without the aid of irrigation.

Such, certainly, is not always the case. Careful analyses go far to show that the hay of watered meadows may be worth more than that of others. It is asserted, too, by other farmers, who have had practical experience, that both cattle and sheep will fatten on irrigated hay alone, and it has often been observed that cattle, and in fact all other stock, so prefer watered portions of a field, that such part is fed much closer, indeed the exact limits of the water are frequently very curiously marked in this way by the cattle, and so distinctly that it may be seen at a considerable distance.

A prominent reason why irrigation merits the attention of farmers, may be found in the fact that it is so remarkably adapted to the promotion of the grass and hay crop, this being the most valuable one grown, and admitting that a given area of watered meadow or pasture yields only double the quantity produced on a like area of dry or unwatered land, it will be seen that the farmer obtains a like increase of this valuable crop to the extent of his watered lands, and may market his hay or increase his stock to the same extent, while at the same time the watered meadow is self-fertilizing, while the dry meadow nearly every year requires an expenditure to keep up its fertility. The irrigated tract, while demanding no manure, may contribute largely in furnishing the necessary manure for other portions of the farm. Whenever it is desired to suspend irrigation for the culture of other crops, the soil in most cases will be found greatly improved, the character changed, and apparently constructed anew, and in a very finely pulverized and permeable state, well adapted to all farm crops. In thousands of instances irrigation may be the cheapest method of enriching soils, whether naturally barren or rendered so by cropping.

An important feature in relation to irrigation is, that whatever its utility may be, its benefits are of the most reliable and durable nature, and whatever its effects may be during one year, they will at least be no less the next and all succeeding years. Probably the most conclusive evidence of this may be seen in Egypt, which has been pronounced the most fertile country in the world, and this fertility is derived from the waters of the Nile, by both natural and artificial irrigation and inundation, and this wonderful and stupendous system of fertilizing the soil, compared with which, all the

efforts of man for the same purpose by other means, are but child's play, has been kept up without cessation from near the commencement of history to the present time, and this same reliability may unquestionably be placed upon its durability for all future time, not only in this country, but throughout the world, and where deterioration of the soil on nearly all our cultivated lands, especially in the older States of the Union, has become painfully evident, such a method of increasing production as irrigation affords, whenever available, is entitled to the consideration of all farmers, and should be regarded as an important item in farm management.

PRACTICAL ENTOMOLOGY.

BY GEO. E. BRACKETT, BELFAST, ME.

Introductory.

In writing this short essay on Entomology, for the use of the farmers of Maine, it has been my aim, so far as possible, to be practical, uniting brevity with simplicity, and making remarks and directions comparatively free from scientific terms and names, so that young farmers and farmers' boys and girls may become acquainted with the simple outlines of the science, and by following the directions, may secure valuable collections of native insects, become interested in the subject, and thereby incited to the further study of the science, which, once entered upon, will never fail of interesting and instructing—a science so replete with subjects that the study of a lifetime might fail to exhaust them. Entomology, or the science that treats of insects, is one of the most interesting and instructive departments of Natural History; and, to the farmer, one of the most important divisions, for insects are his natural and hereditary enemies. In the prosecution of his profession, he is annoyed and beset by myraids of insects, of diversified forms and varieties, which devour his substance, rob him of his possessions, and in many cases drive him vanquished from the field. He can only expect to cope successfully with such assailants by being fully acquainted with their weapons, mode and time of attack, &c., and this can be accomplished only by close observation and study of their habits and lives, and to induce and assist young farmers to commence making such observations, these few remarks have been prepared.

Every farmer is necessarily, to some extent, a practical entomologist. He is almost daily brought in contact and opposed to insects under some of their various forms, and is obliged to devise ways and means to best prevent or counteract their injurious influence. There

is scarcely a leaf, twig, plant or animal that is not the dwelling place of, and is not preyed upon by some insect. The depredations committed annually by either the wheat midge, apple tree borer, or locust are sufficient evidence of the importance of a study that has for its principal object, the attainment of knowledge which shall assist in preventing their ravages, or counteracting their influence.

Descriptions and Classifications.

Entomology (*Entomon*, an insect, *logos*, a discourse,) is that department of Natural History which treats of insects. Insects are animals without backbones, and are therefore termed *invertebrates*. Their chief character consists in the threefold division of their bodies, which are composed of ten jointed rings or sections. Each perfect insect has at least six legs and feet. The different portions of the body of the perfect insect are the *head*, which is furnished with two antennae or feelers, and a pair of compound immovable eyes, the *thorax*, to which are appended the legs and wings and the *abdomen*, which generally contains the respiratory system. They attain their perfect or adult state through a series of changes or transformations termed *metamorphoses*, viz: first the *egg*, second the *larva*, third the *pupa* or chrysalis, and fourth the *imago* or perfect insect; from the egg hatches a small maggot or caterpillar of quick growth, which, after a period, casts its skin and enters into the pupa state, when it is covered with a hard substance and without motion; then after another period throws off this covering and comes forth a perfectly developed insect, which deposits eggs that again pass through the same changes. Insects have been divided into seven orders or classes based on the construction and number of their wings. The primary divisions are termed *orders*, which are divided into sections, the sections into families, families into genera, and genera into species or individuals. The following are the principal orders with descriptions, and notice of some insects of each order for reference and comparison.

Order I. *Coleoptera* (*Koleas*, a sheath, *ptera*, wings.) The beetle tribe; four wings, outer ones hard, for protection; inner ones transparent, for flight, see figs. 2 and 4. Among the individuals of this order are the apple tree borer, May beetle, turnip beetle, wheat weevil, &c. It is in the larva or worm state the insects of

this order are the most destructive, and they are popularly termed *grubs*.

Order II. *Hemiptera* (*Hemion*, the half, *ptera* wings,) bugs, tree lice, &c. Insects with four parchment-like wings and proboscis, with which they pierce and suck animal and vegetable juices. The various kinds of plant lice and the bedbug belong to this order.

Order III. *Orthoptera* (*Orthos*, straight, *ptera* wings.) This order includes grasshoppers, locusts, crickets, cockchafers, &c., and are called straight-winged insects. They have four parchment-like wings, strong jaws, and many of them long hind legs for leaping.

Order IV. *Neuroptera* (*Neuron*, a nerve, *ptera*, wings,) net-winged insects; four net-like wings, as dragon fly, aphis lion, see fig. 5, termites, &c. They are mostly aquatic, and as the perfect insect live but one or two days. Many of them are very beautiful.

Order V. *Lepidoptera* (*Lepis*, a scale, *ptera* wings,) butterflies, moths and sphinges. They comprise the most beautiful and richly ornamented individuals of the insect world, and in the larva or caterpillar state, are among the most destructive. Among them may be named the various tree caterpillars, apple worm, bee moth, grain moth, &c. In the perfect state they have two pairs of large wings, which are very fragile and covered with dust-like scales, see figs. 1 and 3.

Order VI. *Hymenoptera* (*Hymen*, a membrane, *ptera* wings,) vein-winged insects, with four transparent wings and generally provided with a venomous sting. To this order belong bees, wasps, ants, ichneumons. This order comprises insects the most useful to man.

Order VII. *Diptera* (*Dis*, twice, *ptera* wings,) two-winged insects, as midge, mosquito, house fly, fig. 6, flea, hessian fly, gnats, bot and horse flies; many of them are very troublesome. Their larvæ are found in various situations subsisting on vegetable and animal juices.

Cabinets.

Before a collection of insects can be made, it will of course be necessary to procure a receptacle for containing them, and implements &c., for preparing them. As regards size and cost of the cabinet, that will of course depend on the taste and ability of the

collector. One thing is necessary under all circumstances, which is to have the case as tight as possible to prevent the entrance of insects that will destroy the collection. The following is a plan of a cabinet for everyday use, which I have found to answer a good purpose, being easily constructed, cheap and efficient. Almost any farmer's boy can construct such a one. It is made of two inch pine plank, and measures on the inside 28 by 15 inches, and 2½ inches deep with a tight bottom or back made of soft pine board, and the whole inside covered with strong white paper pasted on. The upper inside edge of the frame is grooved ½ inch deep to let in the frames of glass doors fastened to the outside by hinges. The main portion of the case is 20 by 15 inches, having two glass doors hung in wooden frames closing at the centre. The remaining portion, which is separated from the first by a partition, has a door hung in same manner and is divided into two parts, the lower one to hold the setting-board, and the upper one furnished with shelves for containing the necessary implements, vials, alcoholic specimens, &c. A piece of lump camphor should always be kept in the case to assist in excluding insects that devour the specimens.

The case can of course be made smaller, to suit convenience, but such a one will hold what specimens could probably be obtained for one or two seasons. Cabinets for containing permanent collections for exhibition, may be made with glass fronts and movable bottoms. One I have had constructed on a new principle is as follows: Glass front 20 by 28 inches—fronts five inches wide, one and a half thick, pine, moulded and mitered together similar to a picture frame; body of the case three inches wide, pine board, fastened tightly to the center of the front pieces with pine board bottom let into the back or sides, making the case two inches deep, bottom covered with white paper, remainder of case stained black walnut color and covered with heavy coat of varnish. Any cabinet maker can construct one. Cost about $2,00. As before stated, a piece of camphor must be securely fastened in a piece of paper in the corner of each case containing specimens. A good coating of spirits of turpentine is good for the purpose.

Collecting.

Having obtained your case, the next step is to procure insects to fill it. The farmer needs no special rules on this point, as there is scarcely a day passes during their season but he can capture one or more specimens, while pursuing, and without interfering with, his labors. Before going into the field, he should put a couple of pill boxes in his pocket in which to imprison the insect he may capture until he returns home, when he can have it mounted. A handkerchief or piece of paper will often answer the purpose. A butterfly, or moth, may be pinned in the top of the hat. *Coleopterous* insects, as beetles, are met with in the field during planting and sowing. *Lepidopterous* insects are found in the garden, orchard, wood yard, particularly among the flowers; and this order embraces the most coveted specimens. For capturing specimens, a net is required. It may be made of coarse muslin in the shape of a sugar loaf, the open end fastened to a round stiff wire or ring, about eight inches in diameter, and should be twelve inches deep, with handle about two and one-half or three feet long, fastened to the ring. This is very convenient for taking many insects, and it may also be used as a dip net for water insects. Rare specimens can be obtained by placing a lighted lamp in a window, in the evening, towards a flower garden, or the open country. Many moths will come on the outside of the glass, and may thus be secured.

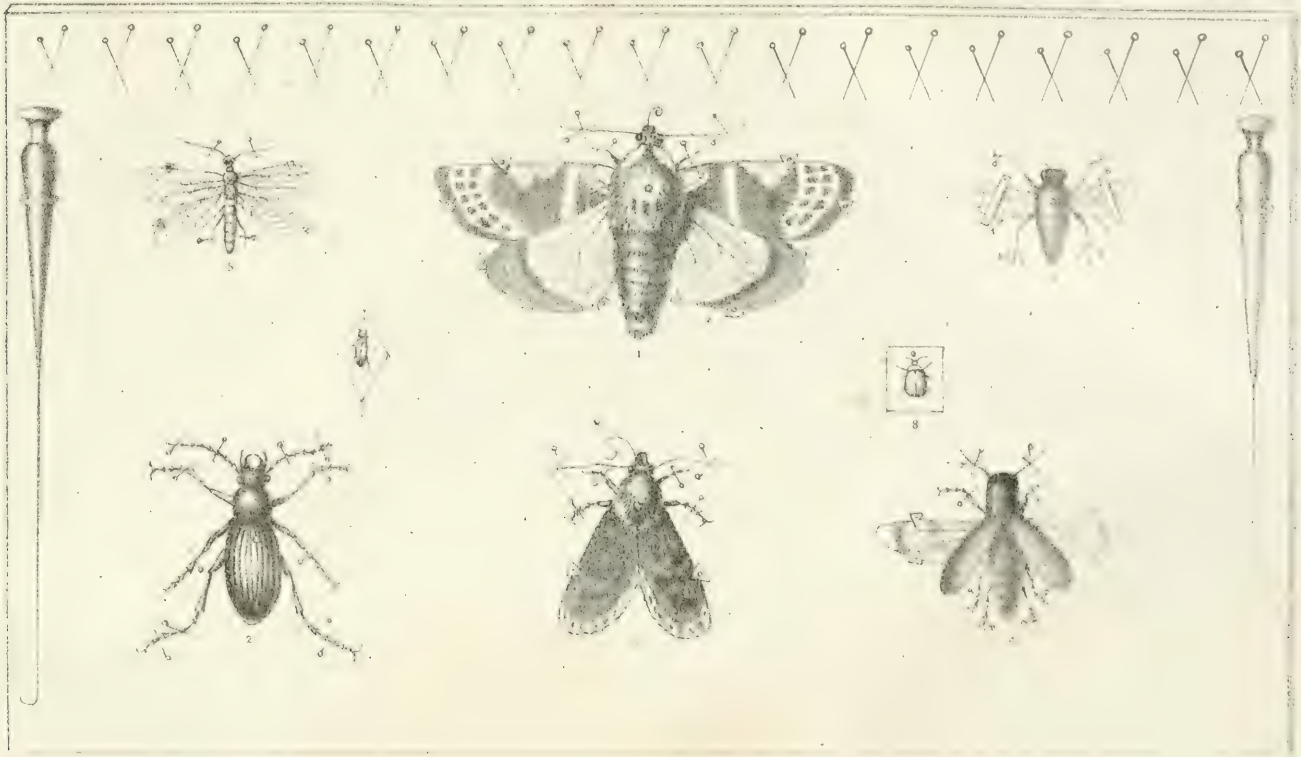
Implements, etc.

Entomologists use implements of various kinds, but I will only name those necessary, and of the simplest kind. They are a setting board, pincers, two setting needles, common brass pins, paper and wooden braces, awl, vial of chloroform, and some gum arabic. The net has already been described. Some small pill or metal boxes are required. The setting board must be made of soft pine or basswood, and pierced with holes of various depths. This is for holding the insects in proper shape, until they are dry and suitable to place in the cabinet (see plate.) The pincers are for handling the specimens. The setting needles may be made of slim darning needles or any steel wire, with a wooden handle. One of them should be slightly hooked at the point, and they may be fastened to the sides or ends of the board when not in use—(see plate.) The pins should be of various lengths,

to correspond with the insects to be pinned. The braces may be made of various shapes with pins through them, and are for extending and holding the wings and legs of the insect—(see plate.) The awl is for piercing holes in the setting board and cabinet. The chloroform is for killing the insects, that they may be set properly. A few drops should always be put on the heads of butterflies and moths, to prevent their breaking their wings by fluttering. Care should be exercised in doing it, that you do not inhale the fumes. It should be taken in the left hand, with the thumb over the mouth of the vial, and a drop applied with a little spatula. The gum arabic is for mending broken limbs and bodies, and setting small insects.

Mounting, Setting, Preserving, etc.

Although experience is the best guide in this subject, yet a few general directions will be valuable, and save many mistakes by the inexperienced collector and student. Only those insects half an inch and upward in length, should be pinned. The process is simply to force a pin through the *thorax*, or between the wings of the insect. Stick the pin into the setting board, arrange the body, wings and legs, as you wish them to remain, and leave them a day or so, to become rigid, and then remove to its permanent place in the cabinet. All insects are pinned in this manner, except beetles, which should be pinned through the right wing cover. The pins should be proportioned in size to the size of the specimen pinned. They should pass vertically through the insect, and project far enough to hold the insect to the setting board and case, and make allowance for setting, and still leave the top end long enough to be easily grasped between the thumb and forefinger. Some collectors bring the insect nearly to the top of the pin, but the better way is to allow the feet to touch the bottom of the cabinet and the pin to project, as the specimen looks more natural and is far easier handled. The limbs should be set in the attitude of life. If more than one specimen of the same species is obtained, they should be arranged in different forms—representing in motion, and in rest. Pins and braces of wood and paper may be used, to keep the limbs in place on the board until rigid. Insects too small to be pinned, may be fastened to slips of stiff card-board or glass, cut to the desired shape—(see plate.) The legs should be fastened with gum to the card, and the card



Geo. E. Brackett del

SETTING BOARD.

And method of preparing Insects for the Cabinet.

pinned in the cabinet. I have found the following to be a handy method of gumming small insects: Take a slip of glass a foot long and two and one-half inches wide, fasten them to it with gum, and suspend the glass in the cabinet. These remarks refer to the perfect insects, as these are in many cases the only ones preserved. To preserve *larvæ* and *pupæ*, they should be placed in vials filled with alcohol—small vials for separate species, or a large wide-mouthed vial for various kinds. In making collections, larvæ and pupæ should receive their share of attention. Beetles may also be preserved in alcohol, but lepidopterous insects are spoiled by coming in contact with the liquid.

Process of setting. *Lepidopterous* insects, as butterflies, moths, &c., should be taken, if held in the fingers at all, with the forefinger of the left hand beneath the body, and the thumb on the top, and two drops of chloroform applied to the head and thorax will put it to sleep. Great care must be taken, while handling insects of this order, to prevent injuring their wings and covering of the body, which is very fragile. After putting it to sleep, force a pin of the proper length through the body, between the wings, and fasten to the setting board. Then, with the setting needle, place the antennæ, or feelers, in the position you wish them to remain, and fasten with pins. Draw out the tongue, or bill, in some specimens, to about half its length, and fasten with a pin. If it is represented at rest, allow the wings to remain in a nearly vertical position. If it is represented in motion, bring the outer edge of the forward or outer wings at right angles with the body, and fasten with braces and pins. Bring the lesser wings forward even with the back edge of the outer wing, and fasten the same. Arrange the legs, or at least the forward pair, put another drop of chloroform on its head and leave till dry—see fig. 1 and 3. The antennæ are very easily broken after drying. To guard against this, in some degree, they may be turned at right angles, or backward over the body of the insect. A little spirits of turpentine should be spread over the setting board, to exclude mites, &c. This order is divided into two very distinct sections, popularly termed butterflies and moths. The butterflies fly by day, and possess antennæ club-shaped at the extremity. The moths fly principally by night, and their antennæ are never club-shaped. The former are termed diurnal lepidoptera, and the latter nocturnal lepidoptera.

In setting *coleopterous* insects, the pin, graduated in size according to the insect, must be forced through the right wing-cover near the thorax, and so down through the abdomen to the board. Draw out the limbs and antennæ. The position should be that of the insect in motion, and the legs should be in a somewhat depending position,—see fig. 2. If there are two specimens of the same insect, one should be set in the attitude of flying, with the wing-covers apart and wings drawn out and fastened, and the pin thrust through the middle of the abdomen,—see fig. 4.

In *hymenopterous* insects, the tongue should be drawn out and fastened with a pin, care being taken to avoid the sting with which many of them are provided. These rules apply to all insects, with variations in either order, which will readily be seen by the collector. As before remarked, experience will suggest the best modes, and give facility to the operations.

Concluding Remarks.

The object of these remarks has been not so much to induce farmers and farmers sons and daughters to make collections of insects, as to encourage and induce observation and investigation, particularly of the myriads of little beings that form the insect world. In collecting and preserving specimens of insects, the person is necessarily made conversant to a certain extent with the particulars in regard to those species, and by continuing is made more interested and familiar, until being led on step by step he acquires a zest for the occupation and enters upon the study of the science which he may continue for a lifetime, and still leave new and interesting subjects for his posterity. And he should not only study and observe, but should record the result of those observations and studies that his followers may have the record of his labors to assist them in the same study and spare them the necessity of travelling the same path.

Do not consider the subject a trivial or useless one, for insect life is as necessary to form the great whole, as any portion of creation. Not a flower unfolds its painted petals to the sunshine, not a pebble that is heedlessly crushed and trodden beneath the foot, not an insect that crawls on the earth or flits through the air, not even the simplest of *His* creation but has its own history forming a fixed portion of some great science whose mysterious truths may well engross the study of a lifetime. Whatever God in his wisdom has seen fit to create, must be worthy for man in his weakness to study.

ON SOME INSECTS INJURIOUS TO VEGETATION.

In the following remarks on some of the insects prejudicial to the farmer, I have drawn freely from various sources whatever seemed best adapted to my purpose. To assist in a clear understanding and easier recognition, the names are placed under their appropriate orders and as full description given of each as was practicable. The Latin or entomological names are given in parentheses.

Lepidoptera.

Lackey moth or apple tree caterpillar, (*Clisiocampa Americana.*) Moth or perfect insect, an inch and one-half and less across the expanded wings, dull reddish color, with two white stripes across the fore wings. They are most numerous about the first of July, when they deposit their eggs in clusters or belts upon the twigs of the trees, where they remain until the next spring, when the warm weather hatches the eggs. As soon as the larva or worm comes from the egg, it begins spinning from its mouth a fine thread with which it forms itself a residence, from which it emerges to feed upon the leaves of the trees. As they increase in size they change their skin, or moult, five or six times, giving them a diversified appearance. By June they become full grown and disperse to some retreat where they spin their cocoons and undergo the change into pupæ, from which they come forth a moth or winged insect as above described.

This variety of caterpillar is so numerous and common as to be called *the caterpillar*, and is one of the worst enemies of the orchard. Various methods may be employed to destroy them, as cutting off the twigs containing the eggs and burning them, breaking off the twig containing the nest and crushing them, and burning the nest by using a swab of cotton dipped in turpentine fastened on the end of a pole, and set on fire. A valuable auxiliary is found in a large beetle which lives in the gardens, called the *caterpillar hunter* which lives upon and destroys the various kinds of caterpllars.

The codling moth or apple worm, (*Carpocapsa Pomonella.*) The moth is three quarters of an inch, wings expanded. Its wings are very beautiful, resembling watered silk, in color grayish brown. It lays its eggs during June and July in the *caly calyx* or blossom end of the young fruit, where it hatches and the young grub cuts its

way into the fruit, from which, when full grown, it escapes into the ground or some crevice, spins its cocoon in which it remains in a dormant state until the warm weather, when it comes forth a moth and deposits its eggs as described. As the fruit affected by them usually falls before it is ripe and while containing the larvæ, they should be destroyed to check their increase.

Handmaid moth, or yellow necked apple tree worm, (*Eumetopona ministra.*) This is one of the largest moths, measuring from two to two and a half inches across the spread wings. The fore wings are of a dusky buff color crossed with four or five bands of darker shade. The hind wings are nearly white, body buff, head and thorax orange. They appear in June and July, deposit their eggs on the under side of an apple tree leaf, which hatch about the middle of July, live upon the leaves, and when mature are coal black, leave the tree and change as above. Birds destroy great numbers of these caterpillars and the rest can be easily destroyed by the hand.

White miller, or yellow bear caterpillar, (*Arctia Virginica*) The moth is from an inch and a half to two inches across the expanded wings; it is white with a black point on the middle of the fore wings and black dots on the hind wings. They lay their eggs in May and June. The larvæ are voracious and eat almost any kind of plants. The caterpillar varies in color from a yellowish to a dusky brown; when mature they are about two inches long. They continue dormant in the chrysalis state during the winter and come forth the perfect insect or moth as above described.

The bee moth, (*Galleria cerandea.*) Moth is nearly an inch and a half across expanded wings, dirty gray color with purple brown tinges on fore wings, and hind wings much lighter, in the male, yellowish, in the female dirty white and both fringed. There are two broods in a year, one in last of April or first of May, the other in August. The first brood turn to moths in June the second in September. This variety are the more numerous and live entirely on the beeswax. There is another kind (*Galleria alveria*) or honey moth, which lives on the honey alone. The first named or comb moth deposits its eggs at night in the hive, or if it cannot enter, it lays them on the outside, where they hatch and crawl or eat their way inside. After the worm is hatched it covers itself with a co-

coon, in which it can move backward and forward and covers the cocoon with a coating of wax &c., which protects it from the sting of the bees, and feeds upon the beeswax. The hives should be examined frequently and the moths killed. A shallow dish partly filled with sweetened water and set near the hive will delude many of them.

The cut worm, (*Agrotis.*) There are several species of Agrotis as the *A, gothica, A, segetum* etc. They commit their ravages among all kinds of vegetables and are most destructive during June and July. The moths vary from a pale ash to a deep brown color, but that of the *corn cut worm, A segetum* presents the peculiarities of the family. It is of a brownish gray freckled with colored shades. It expands from an inch and a half to three quarters; during the day they keep concealed and lay their eggs by night, when they may be seen in the room attracted by the light of a candle.

The larva or worm remains concealed in the ground during the day and comes forth at night to feed upon the succulent corn. The best way to destroy them is to dig them out of the retreat beside the young corn and kill them. It is a good idea also to plant plenty of seed as the worm cuts off only one or two in a hill.

The spindle worm, (*Gortyna Zeæ.*) The moth expands an inch and a half; head, thorax and fore wings a rusty red color, hind wings yellowish gray. The caterpillar worm is about the size of a goose quill and an inch or more long. It receives its name from its destroying the spindle of the Indian corn. It commences near the ground and eats its way upward in the spindle of the corn, causing the leaves to wither, by which sign its appearance is known. Probably the only way of destroying them will be to kill the worm while at work and thus prevent a continuation of the species.

The grain moths (*Tinea granella.*) This is a very small moth being not over half an inch across the expanded wings. There are many varieties which cause much damage to stored grain, their larva or worm state being attained similar to those before named. Heating grain to one hundred and sixty-seven degrees will kill the insect in all forms.

The cabbage moth, (*Mamestra Brassica.*) The moth is little more than half an inch across the expanded wings. It occurs from

May till October. The worm infests the leaves of cabbage, lettuce, etc., eating round holes through them, but seldom attacks the heart of the plant. It is very quick, wriggling away backward rendering it difficult to destroy it. It spins a cocoon and fastens to the under side of the eaten leaf, from which it comes forth a moth again to lay its eggs, produce larva, and so on through its changes. Poultry are useful in destroying the worm. Watering the plants will drive them away for a time. But probably its greatest enemy is a small parasite or ichneumon fly, which deposits its eggs in the body of the worm where they hatch and feed upon its substance till the worm dies, when it changes into a pupa in the dead body and undergoes the natural transformations.

Coleoptera.

Apple tree borer, (*Saperda bivittata.*) The beetle varies from a half to three-quarters of an inch in length. Its back is striped, and under side of body and antennæ and legs are white. The larva, or borer, or what causes the damage, is a white fleshy grub with legs. The beetle, or perfect insect, lays its eggs by night at the base of the tree, in June and July. From the egg, a maggot soon hatches, which eats its way into the soft bark of the tree. Increasing in size, it reaches the sap wood, where it remains until about half grown, when it enters the heart wood, gnawing upward to the heart of the tree. This is the second year or summer of its existence, and it remains dormant through the winter, changes to a pupa in the spring, and comes forth from the tree a perfect insect in June. As this insect is so well known, a further description is not needed. Every farmer has had occasion to witness its ravages. Although one of the most destructive insects, yet its ravages can be most easily checked. A thorough inspection of apple trees, spring and autumn, will generally prevent much destruction from them. The wood peckers are the best assistants in destroying them, and they should never be molested while in an orchard.

The wheat weevil, (*Calandra granaria.*) The beetle is about the size of a flea, of a chesnut color. It bores into grain with its snout and deposits an egg which hatches a grub that eats all the substance of the kernel of grain, passes into a pupa and then to the beetle. It commits great havoc in granaries, and the only sure

method of destroying them is to kiln dry the grain. Some recommend mixing unslacked lime with the grain, about four quarts to a hundred bushels.

The click beetle, or wire worms, (*Agriotes.*) The beetles vary from one-third of an inch to one and a half inches in length, of a blackish or brown color, with yellow legs. They are called click beetles, or "snapping bugs," from their being able to throw themselves up with a snap or jerk, when laid on their backs. The larvæ, or wire worms, are about an inch long, yellow color, with brown head. They are very destructive to all kinds of plants, and nothing but starvation will entirely destroy them. Birds destroy them in all stages of change.

Pea beetle, (*Bruchus Pisi.*) The beetle is about the size of a bedbug; round, flat, dark colored, with light spots on the wing covers and abdomen. They deposit their eggs on the pea pods, soon after blossoming. They hatch, and the maggot enters the pea, where it remains during its changes, feeding on the pea. The insect is limited to a particular period for depositing its eggs, therefore late sown peas will be more likely to escape. Probably those sown as late as the 12th of June, in this latitude, will escape their ravages.

The squash bug, (*Coreus Tristis.*) The common striped squash or cucumber bug, is well known by every one that tills a garden. They remain dormant during the winter, and in the spring come forth and destroy the young and tender leaves of melons, squash, &c., lay their eggs which hatch, and live on the same food until late summer, when they attain their full size and conceal themselves for winter. We know of nothing that will entirely prevent their ravages. Plants affected should be examined frequently, and the bug killed. A screen placed around the hill is usually effective. It may be made of part of an old barrel, box, bark, or cloth on a frame.

The May beetle, (*Phyllophaga quercina.*) The common beetle is about an inch long and sometimes a little longer. It is popularly termed "beetle bug." Is of a chesnut brown; feeds upon leaves, particularly cherry, in its perfect state, and flies at night with a humming noise. The grub is destructive to plants. It is a white worm with a brownish head, and as thick as the little finger when fully grown. Fowls, crows, and some mammals eat them.

The Curculio, or plum weevil, (*Rhynchenus Nenuphar.*) The beetles are about one-fifth of an inch long, dark brown, with spots of white and black. They are seen from first of April till middle of June, and continue their operations all summer. They make a puncture in the fruit with their curved snout with which they are provided, and lay an egg in each puncture, which hatches, and the grub, on arriving at maturity, enters the ground from which it comes forth a beetle, in the space of three weeks. Its ravages are not confined to the plum, but extend to all the fruits. One of the methods suggested, and perhaps the most effectual one, is to jar the tree in the morning, and catch the insects on a sheet as they fall.

The rose bug, (*Macrodactylus subspinosa.*) The beetle is about a third of an inch in length, of a blackish color above and the under side of the body white. They appear in June, sometimes suddenly in great numbers. The females deposit their eggs in the ground which hatch in about twenty days, and the *grubs* feed on tender roots &c. The beetle commits depredations on all green plants. The grub comes to maturity by autumn and remains dormant in the ground during the winter, and emerges as a perfect insect or beetle the next spring. They have enemies in the form of insectivorous birds, fowls and the large dragon fly. It is said the only reliable method of getting rid of them is to crush, burn or scald them.

The turnip beetle, (*Altica nemorum*) The beetle is about one tenth of an inch long, sometimes called the turnip fly. It is shiny black with two yellow strips on the back. It deposits its eggs on the under side of the leaf where they hatch, pierce the skin and eat the pulp until they are full grown, fall to the ground and become pupæ, then to the beetle. Some recommend that radishes be sown with the turnips as they will eat the radish and leave the turnip. Dusting the plants while the dew is on with soot, lime or ashes sometimes check it. The great point is to give the plants a rapid growth so that the insect will not have time to do them much injury.

Hemiptera.

Gooseberry saw fly, or gooseberry worm, (*Nematus trimaculatas.*) The flies are about two thirds of an inch across the expanded wings. They come from their winter retreats the last of April, and the females soon deposit their eggs on the under side of

the leaf: they hatch in a few days and commence eating the leaf: when full grown they descend into the earth and undergo the transformation into the perfect insect: there are several broods in a year but the later ones remain in the ground all winter and come forth flies in the spring. Syringing the bushes with water heated to 140 degrees will destroy the caterpillar or worm without hurting the bushes. Slacked lime scattered on the bushes when the dew is on is a good remedy.

Onion fly or maggot, (*Anthomyia ceparum.*) It is about half the size of the house fly, of an ash gray color, wings clear and transparent. It lays its eggs on the leaves of the onion near the earth which hatch in a week or two, when the maggot descends to the base of the onion where it feeds and the onion soon becomes rotten. It then deserts the bulb, enters the ground, becomes a pupa, from which the perfect insect or fly emerges in three weeks. The fly lays again, dies, and the last eggs hatch and the brood passes the winter in the pupa state. It is difficult to destroy them they are so small and prolific. Among the methods recommended are strewing the beds with charcoal, soot or salt, watering with lime water, gas tar, urine, soap suds &c. A good idea is to plant in a different place each year.

Thrips (*Thrips*) This is a tribe of minute and very active insects that prey upon grain, potatoes, peach trees &c. It is said there is a mite or ichneumon that preys upon them preventing their increase.

The apple bark louse, (*Aspidiotus conchiformis.*) About one eighth of an inch long, oval, brown color, called "oyster shaped louse." It sucks the juice of the tree to which it adheres. It infests the apple, currant, rose and butternut. It lays its eggs upon the tree and dies, covering the eggs with its body, from which the maggots come and spread over the tree. Tar and linseed oil beat together and applied with a brush to the affected parts of the tree before the buds expand in spring, is said to destroy the eggs concealed under the scales. The insects live only a short time, in June, appearing like minute specks of mould, and are then very easily destroyed by washing the bark with soap suds.

Plant lice (*Aphides.*) This is a numerous class of minute insects, some winged, of all shapes and colors. They suck out and

feed on the juices of plants; they are preyed upon by the lady bird, aphis lion, beetles, wasps and flies. Drenching the plants with a solution of *whale oil soap*, (one pound to three gallons of water) will destroy them.

Orthoptera.

Locusts, (*Locusta*) This is the correct name of what we call the grasshopper, and comprises several species, which some seasons are very destructive to the farmer. They are so well known, it is useless to describe them fully. The perfect insect lays an egg from which hatches the larva. They are voracious, in all the stages of their existence from the egg. During dry seasons, they often commit great havoc, but they never commit such devastation in this country as in the east, where they are a great scourge. Birds, small mammals and domestic fowls destroy many of them, and many methods have been employed, but they cannot be considered effectual.

The grasshopper is generally of a green color, furnished with wings and wing covers resembling a leaf, and live in trees principally, and on leaves. They are partly nocturnal, and lead a solitary life. They lay their eggs in the autumn in the earth, and are hatched in the following spring.

The seventeen year locust, or red-eyed cicada, (*Cicada Septendecim*,) should not be confounded with either of the above named species, being an entirely different insect; belonging to the order Hemiptera. This insect is remarkable for its periodical appearance, as it is seen in different localities at different years, but always at intervals of seventeen years, hence the name. It is a very large black fly, with fur, glossy black wings, orange colored ribs and red eyes Its depredations are principally confined to the forest trees, but it occasionally feeds upon fruit trees. The perfect insect lives on the juice of the tree, the female placing her eggs in the punctures The pupæ, it is said, live on roots and grasses in the ground for seventeen years, and at the appointed time come forth the perfect insect. This is one of the most noted of American insects. No means of preventing their ravages has been discovered.

Diptera.

The wheat midge, (*cecidomyia tritici.*) The perfect insect is an orange colored fly, about one-tenth of an inch long, slender legs,

and transparent wings. It makes its appearance in the winged state in the last part of June, and the female deposits her eggs in the blossom or on the germ of grain. After laying her complement of eggs, the female dies. The eggs hatch in eight or ten days, producing a very minute orange colored maggot, which eats and subsists on the juices of the young grain for about three weeks, when they have arrived at maturity, they wriggle down the stalk into the ground, where they remain during the winter in the maggot state; change into pupa in May or June of the next spring, and in a few weeks come forth the perfect insect, to renew their devastation and pass through the same changes again. Much has been said and written with regard to this insect, and many methods devised for its destruction, but none seem to have been successful. Of these, may be mentioned ploughing the stubble deep, and burying the maggot, burning the stubble, strewing lime, ashes, &c., on the grain in blossom, and sowing in locations exposed to free currents of air. It is deemed good policy to sow early, and early blossoming varieties, that the chaff and grains may be hardened by age to resist and be too hard for the insect to pierce and deposit its eggs.

The Hessian fly (*Cecidomyia destructor.*) Very small black fly resembling the midge in appearance. The female deposits her eggs on the leaves of grain as soon as the plants appear in spring and autumn. They hatch in a week and the maggot enters the stem where it remains till attaining full size in five or six weeks, when it changes into pupa, from which the perfect insect soon comes. There are two or three broods in a year. This is not so destructive as the midge. There are parasites or other insects that prey on the fly and thus assist in its destruction. There is also a parasite or ichneumon, (*platyglaster tipulæ*) that preys on the midge, and it is hoped it will become sufficiently numerous to check its ravages.